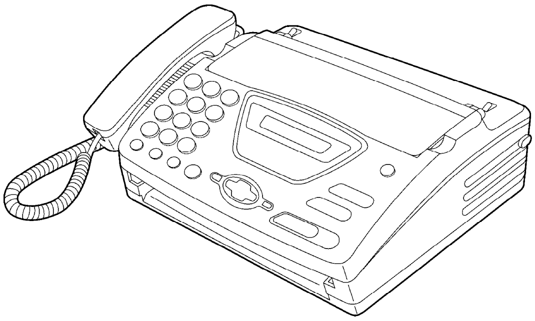
ORDER NO. KMF0111517C3

Service Manual

Personal FAX

KX-FT71LA-B
(for Latin America)



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⚠ **WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

When you note the serial number,write down all 11 digits. The serial number may be found on the bottom of the unit.

1. INTRODUCTION

1.1. LCD MESSAGE

English	Translation(Spanish)															
CALL SERVICE 1	L	L	A	M	E		S	E	R	V	I	C	I	O	1	
CALL SERVICE2	L	L	A	M	E		S	E	R	V	I	C	I	O	2	
CHECK COVER	R	E	V	I	S	A	R		L	A		T	A	P	A	
CHECK DOCUMENT			R	E	V	I	S	A	R		D	O	C	.		
CHECK MEMORY	R	E	V	I	S	A	R		M	E	M	O	R	I	A	
DIRECTORY	D	I	R	E	C	T	O	R	I	O						
NO RESPONSE	N	O		R	E	S	P	U	E	S	T	A				
OUT OF PAPER	S	I	N		P	A	P	E	L							
POLLING ERROR	E	R	R	O	R		D	E		R	E	C	U	P	.	
PRESS [<>]&[SET]	P	U	L	S	E	[	<<	>>	]	&	S	E	T			
RECEIVE MODE	M	O	D	O		R	E	C	E	P	.					
REDIAL TIME OUT	C	A	N	C	E	L	A		R	E	D	I	S	C		
REMOVE DOCUMENT			R	E	M	O	V	E	R		D	O	C	.		
SETUP ITEM [ ]	N	O	.	P	R	O	G	.		[			]			
SYSTEM SET UP	P	R	O	G	.		S	I	S	T	E	M	A			
TRANSMIT ERROR	E	R	R	O	R		D	E		T	R	A	N	S	.	
UNIT OVERHEATED	S	O	B	R	E	C	A	L	E	N	T	A	D	O		
USER STOPPED	A	L	T	O		X		U	S	U	A	R	I	O		
YOUR FAX NO.	S	U		N	O	.		D	E		F	A	X			
YOUR LOGO	S	U		L	O	G	O									

1.2. SAFETY PRECAUTIONS

1. Before servicing, unplug the AC power cord to prevent an electric shock.

2. When replacing parts, use only the manufacturer's recommended components.

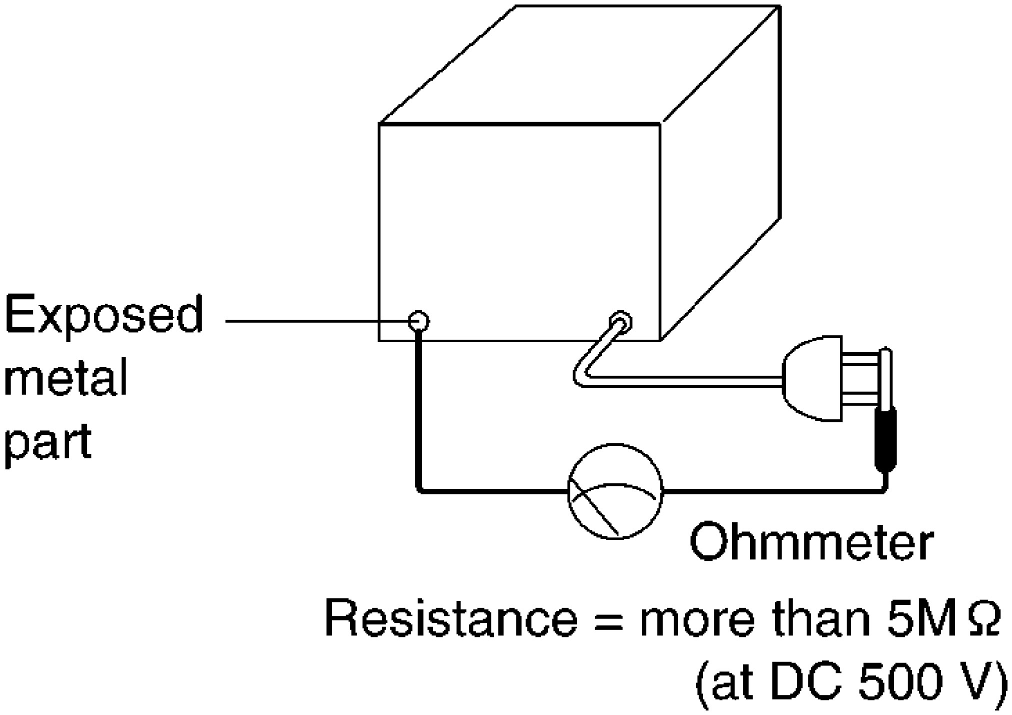
3. Check the condition of the power cord. Replace if wear or damage is evident.

4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.

5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.3. INSULATION RESISTANCE TEST

1. **Unplug the power cord and short the two prongs of the plug with a jumper wire.**
2. **Turn on the power switch.**
3. **Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).**
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. **If the measurement is outside the specified limits, there is a possibility of a shock hazard. / The equipment should be repaired and rechecked before it is returned to the customer.**



1.4. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity. / When repairing, the following precautions will help prevent recurring malfunctions.

1. **Cover the plastic part's boxes with aluminum foil.**
2. **Ground the soldering irons.**
3. **Use a conductive mat on the worktable.**
4. **Do not touch the IC or LSI pins with bare fingers.**

1.5. BATTERY CAUTION

CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution :

Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.

A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.

Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

Recommend Type Number:

PFSU1004Z (BAT501) Manufactured by TOSHIBA

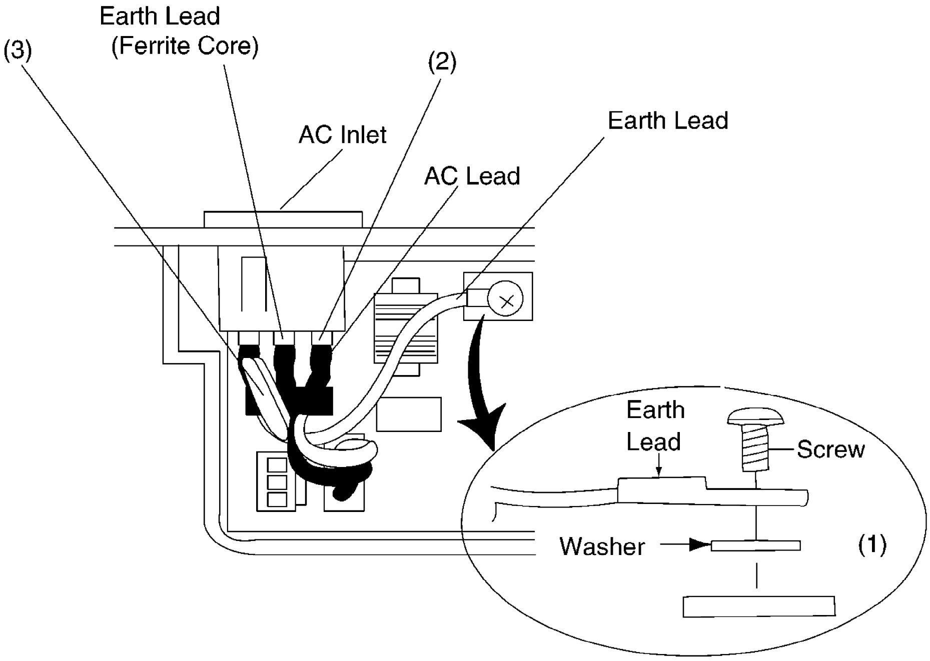
CR2032 (BAT501) Manufactured by MATSUSHITA

PQPCR2032H09 (BAT501) Manufactured by SONY

1.6. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

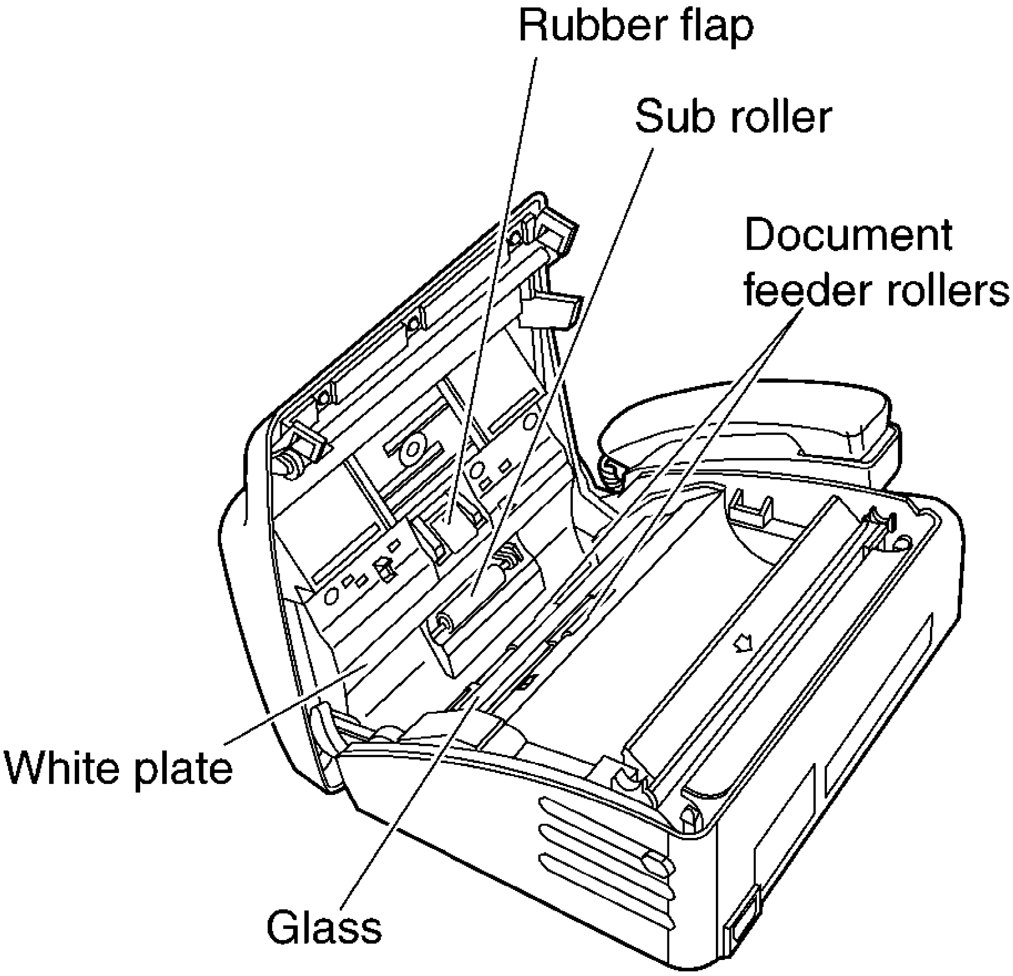
(1) The earth lead is fixed with the screw.
(2) The AC connector is connected properly.
(3) Wrap the Earth Lead lead around the core 2 times.


Earth Lead
(Ferrite Core)
(3)
(2)
AC Inlet
Earth Lead
AC Lead
Earth
Lead
Screw
Washer
(1)

1.7. PERSONAL SAFETY PRECAUTIONS

1.7.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit. / The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.


Rubber flap
Sub roller
Document feeder rollers
White plate
Glass

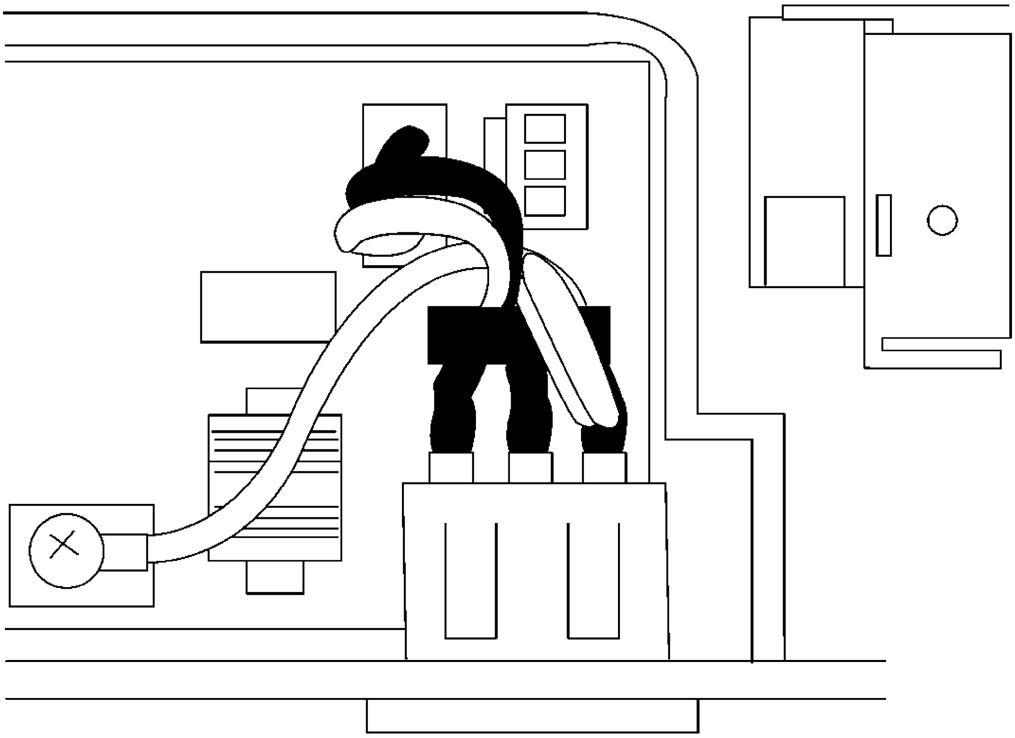
1.7.2. LIVE ELECTRICAL SECTIONS

All the electrical sections of the unit supplied with AC power by the AC power cord are live. / Never disassemble the unit for service with the AC power supply plugged in.

AC voltage is supplied to the primary side of the power supply unit.
Therefore, always unplug the AC power cord before disassembling for service.

Be careful of "High Voltage" in this area.

(Bottom view)



1.8. FEATURES

General

- **Help function**

  Please refer to WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.() to print below features.

  Display:(Refer to LCD MESSAGE ())

- **DIRECTORY**
- **RECEIVE MODE**

Facsimile

- **Space Saving Compact Design**
- **Resolution: Standard, Fine/Photo, Super Fine**
- **Copier Function**
- **Automatic Document Feeder (10 Sheets)**
- **Help Printout**
- **Easy-to-view LCD (15 Characters)**

Integrated Telephone System

- **Electric Volume Control**
- **On-hook dialing**
- **Redialing function**
- **Temporary tone dialing**
- **Electric Telephone directory**

1.9. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (8 1/2”) in width
Max. 600 mm (23 5/8”) in length

Effective Scanning Width:

208mm (8 3/16”)

Recording Paper Size:

216 mm max. 30 m (8 1/2”×98”) roll

Effective Printing Width:

208 mm (8 3/16”)

Transmission Time*:

Approx. 15 s/page (Original mode)**
Approx. 30 s/page (G3 Normal mode)

Scanning Density:

Horizontal:
8 pels/mm (203 pels/inch)
Vertical:
3.85 lines/mm (98 lines/inch)—STANDARD
7.7 lines/mm (196 lines/inch)—FINE/PHOTO
15.4 lines/mm (392 lines/inch)—SUPER FINE

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Thermal Printing

Data Compression System:

Modified Huffman (MH), Modified READ (MR)

Modem Speed:

9,600 / 7,200 / 4,800 / 2,400 bps; Automatic Fallback

Operating Environment:

5°C—35°C (41°F—95°F), 45 %—85 % RH (Relative Humidity)

Dimensions (H×W×D):

118 mm × 338 mm × 246 mm (4 5/8” × 13 5/16” × 9 11/16”)

Mass (Weight):

Approx. 2.5 kg (5.5 lb.)

Power Consumption:

Standby: Approx. 5.5 W
Transmission: Approx. 20 W (When sending the ITU-T No.1 Test Chart)
Reception: Approx. 33 W (When receiving the ITU-T No. 1 Test Chart)
Copy: Approx. 30 W (When copying the ITU-T No. 1 Test Chart)
Maximum: Approx. 120 W (When copying a 100 % black document)

Power Supply:

120 V AC, 60 Hz

* Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.
** Transmission speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to TEST CHART ().)
If the capability of the other party’s machine is inferior to your unit, the transmission time may be longer.

Note:

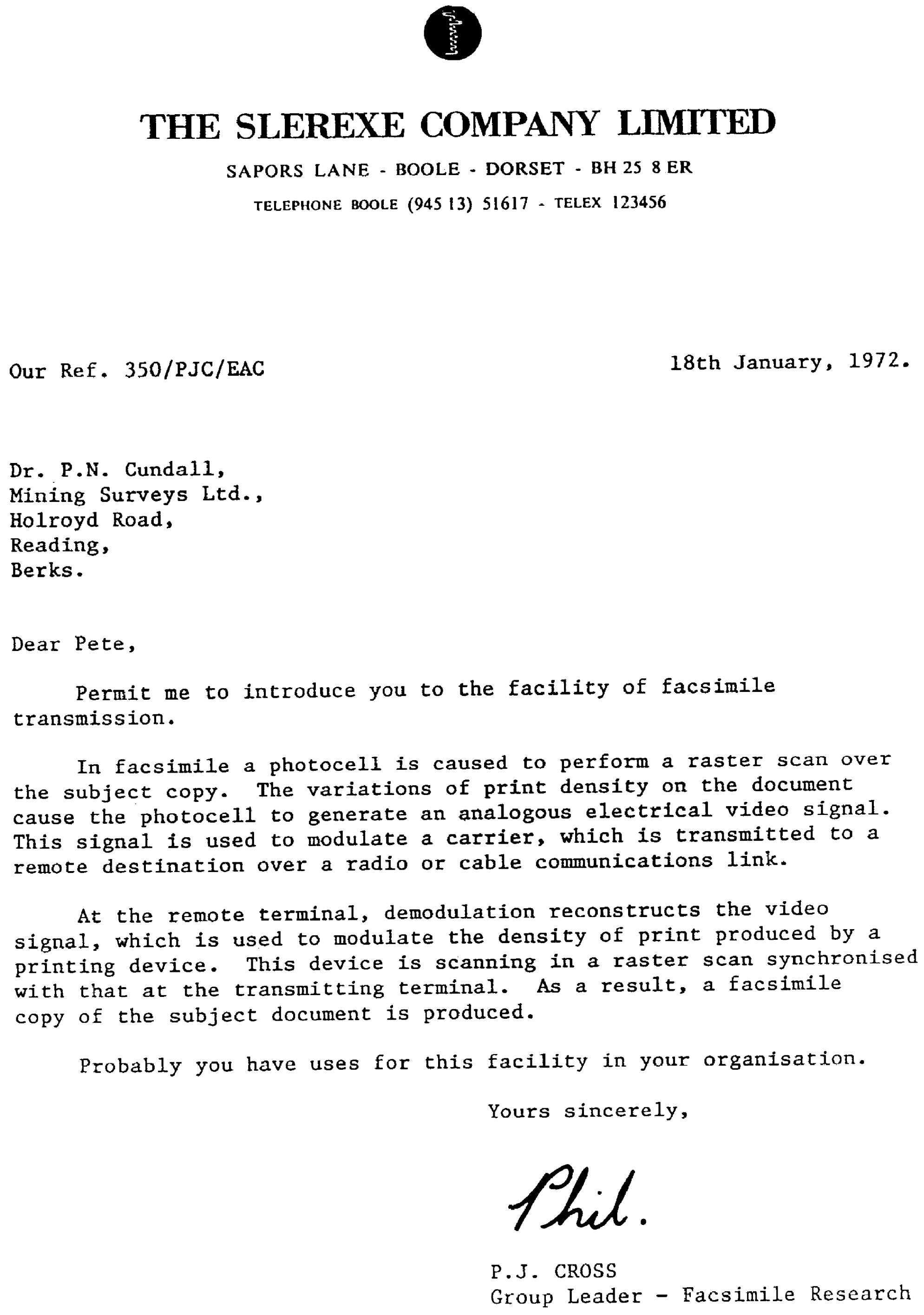
- Any details given in these instructions are subject to change without notice.
- The pictures and illustrations in these instructions may vary slightly from the actual product.

1.10. OPTIONAL ACCESSORY

Model No.	Description	Specifications
KX-A106	Standard thermal recording paper	216 mm × 30 m (8 1/2”×98’) roll, with 25 mm (1”) core

1.11. TEST CHART

1.11.1. ITU-T NO.1 TEST CHART



THE SLEREXE COMPANY LIMITED
SAPORS LANE - BOOLE - DORSET - BH 25 8 ER
TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

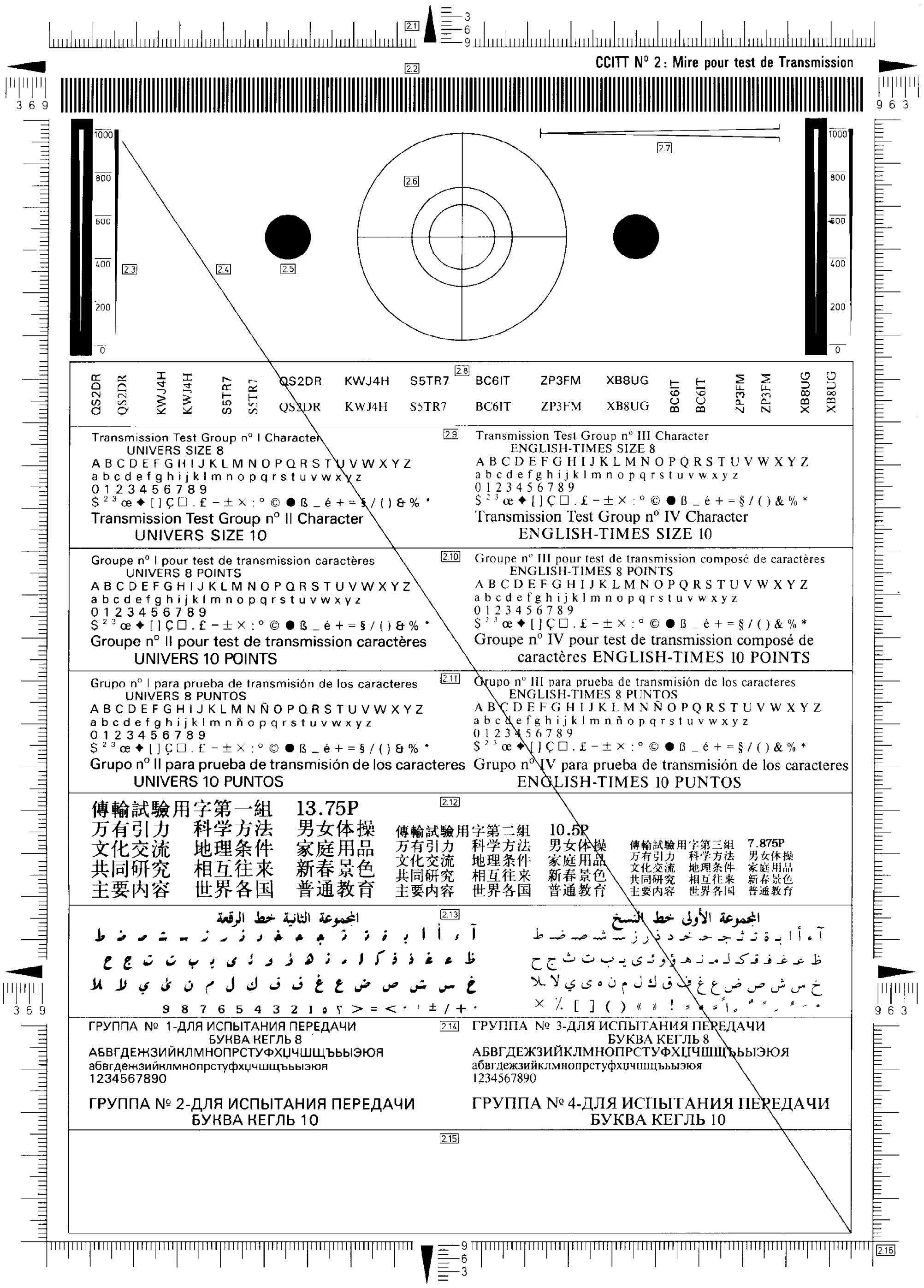
Probably you have uses for this facility in your organisation.

Yours sincerely,

Phil.

P.J. CROSS
Group Leader - Facsimile Research

1.11.2. CCIT NO. 2 TEST CHART


2.1
3
6
9
CCITT N° 2: Mire pour test de Transmission
2.2
3 6 9
9 6 3
1000
800
600
400
200
0
2.3
2.4
2.5
2.6
2.7
2.8
QS2DR
KWJ4H
S5TR7
BC6IT
ZP3FM
XB8UG
2.9
2.10
2.11
2.12
2.13
2.14
2.15
2.16

Transmission Test Group n° I Character
UNIVERS SIZE 8
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Transmission Test Group n° II Character
UNIVERS SIZE 10

Transmission Test Group n° III Character
ENGLISH-TIMES SIZE 8
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Transmission Test Group n° IV Character
ENGLISH-TIMES SIZE 10

Groupe n° I pour test de transmission caractères
UNIVERS 8 POINTS
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Groupe n° II pour test de transmission caractères
UNIVERS 10 POINTS

Groupe n° III pour test de transmission composé de caractères
ENGLISH-TIMES 8 POINTS
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Groupe n° IV pour test de transmission composé de
caractères ENGLISH-TIMES 10 POINTS

Grupo n° I para prueba de transmisión de los caracteres
UNIVERS 8 PUNTOS
A B C D E F G H I J K L M N Ñ O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n ñ o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Grupo n° II para prueba de transmisión de los caracteres
UNIVERS 10 PUNTOS

Grupo n° III para prueba de transmisión de los caracteres
ENGLISH-TIMES 8 PUNTOS
A B C D E F G H I J K L M N Ñ O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n ñ o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
§ ² ³ œ ✦ [ ] Ç □ . £ − ± × : ° © ● ß _ é + = § / ( ) & % *
Grupo n° IV para prueba de transmisión de los caracteres
ENGLISH-TIMES 10 PUNTOS

傳輸試驗用字第一組 13.75P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育

傳輸試驗用字第二組 10.5P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育

傳輸試驗用字第三組 7.875P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育

المجموعة الثانية خط الرقعة

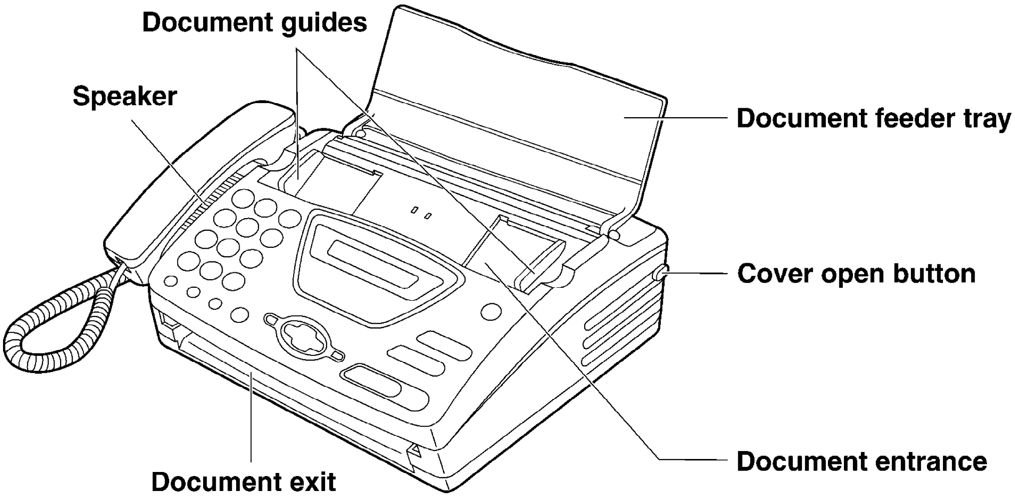
المجموعة الأولى خط النسخ

ГРУППА № 1-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 8
АБВГДЕЖЗИЙКЛМНОПРСТУФХЦЧШЩЪЬЫЭЮЯ
абвгдежзийклмнопрстуфхцчшщъьыэюя
1234567890
ГРУППА № 2-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 10

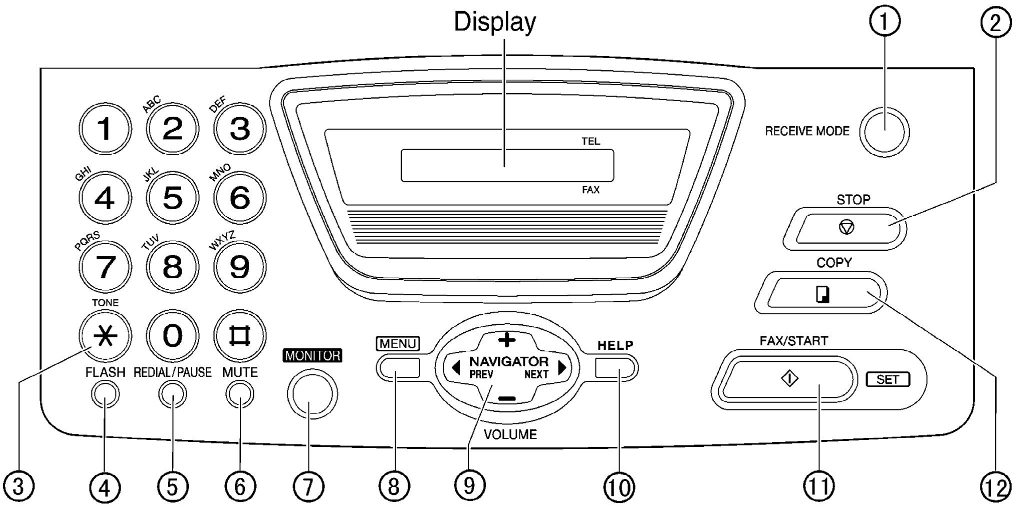
ГРУППА № 3-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 8
АБВГДЕЖЗИЙКЛМНОПРСТУФХЦЧШЩЪЬЫЭЮЯ
абвгдежзийклмнопрстуфхцчшщъьыэюя
1234567890
ГРУППА № 4-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 10

1.12. LOCATION OF CONTROLS

1.12.1. OVERVIEW


Document guides
Speaker
Document feeder tray
Cover open button
Document entrance
Document exit

1.12.2. CONTROL PANEL


Display
①
②
RECEIVE MODE
TEL
FAX
STOP
COPY
FAX/START
SET
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
TONE
0
FLASH
REDIAL/PAUSE
MUTE
MONITOR
MENU
NAVIGATOR
PREV
NEXT
+
−
VOLUME
HELP
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫

①RECEIVE MODE

- To change the receive mode.

②STOP

- To stop an operation or cancel programming.

③TONE

- To change from pulse to tone temporarily during dialing when your line has rotary pulse services.

④FLASH

- To access special telephone services such as call waiting or for transferring extension calls.

⑤**REDIAL/PAUSE**

- To redial the last number dialed. If the line is busy when you make a phone call using the MONITOR button, the unit will automatically redial the number up to 5 times.
- To insert a pause during dialing.

⑥**MUTE**

- To mute your voice to the other party during a conversation. Press this button again to resume the conversation.

⑦**MONITOR**

- To dial without lifting the handset.

⑧**MENU**

- To initiate or exit programming .

⑨**NAVIGATOR, VOLUME**

- To adjust volume.
- To search for a stored name.
- To select the features or feature settings during programming.
- To navigate to the next operation.

⑩**HELP**

- To print a quick reference.

⑪**FAX/START, SET**

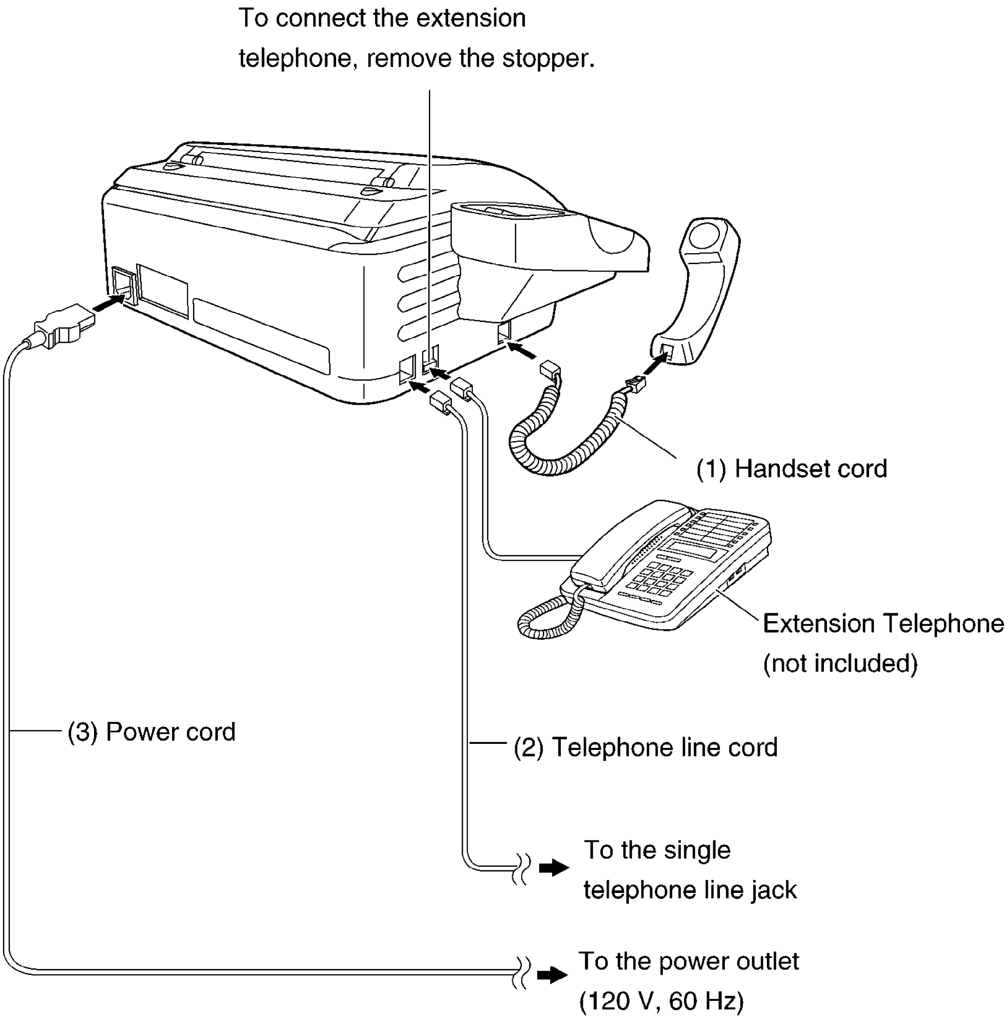
- To initiate fax transmission or reception.
- To store a setting during programming.

⑫**COPY**

- To initiate copying.

1.13. CONNECTIONS

(1) Connect the handset cord.
(2) Connect the telephone line cord.
(3) Connect the power cord.


To connect the extension telephone, remove the stopper.
(1) Handset cord
Extension Telephone (not included)
(3) Power cord
(2) Telephone line cord
To the single telephone line jack
To the power outlet (120 V, 60 Hz)

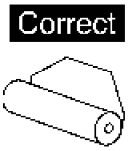
NOTE

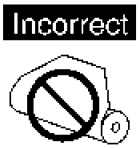
When you operate this products, the power outlet should be near the product and easily accessible.

1.14. INSTALLATION

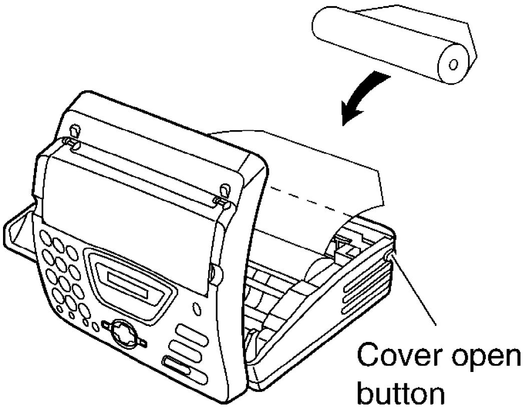
1.14.1. INSTALLING THE RECORDING PAPER

1. **Open the cover by pressing the cover open button and install the recording paper roll.**



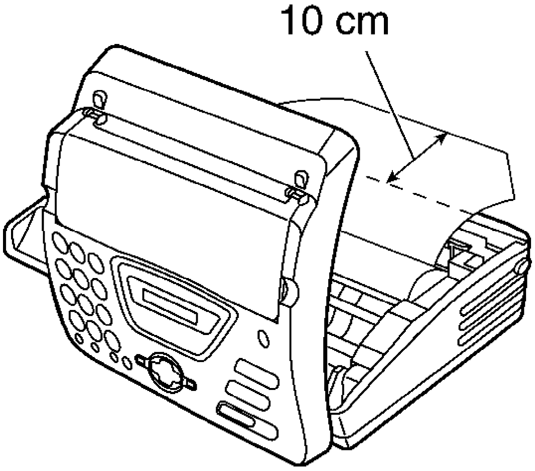


- **If the paper is secured with glue or tape, cut approximately 15 cm (6 inches) from the beginning of the roll.**

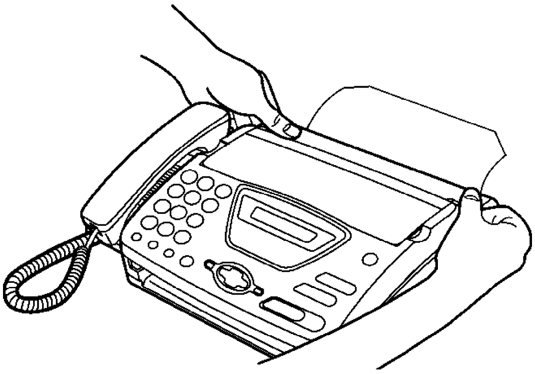


2. **Pull the leading edge of the paper approximately 10 cm (4 inches) out of the unit.**

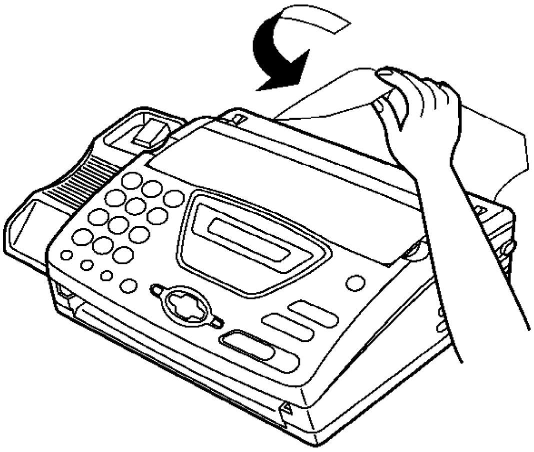
   - Make sure that there is no slack in the paper roll.



3. **Close the cover securely by pushing down on both sides.**



4. **Tear off the excess paper by pulling it towards you.**



Note:

- **Only use the included roll of paper or specified recording paper, or else the print quality may be affected and/or excessive thermal head wear may occur.**
- **To order recording paper, see OPTIONAL ACCESSORY ().**
- **When the power cord is connected, every time you close the cover a message will be printed if the recording paper is set to the wrong side, a message will not be printed. Install the paper correctly.**

1.14.2. SETTING YOUR LOGO

The logo can be your company, division or name.

1. Press MENU .

Display:Refer to LCD MESSAGE ()

SYSTEM SET UP

2. Press SET .

PRESS [◄ ►]&[SET]

3. Press ◄ or ► until the following is displayed.

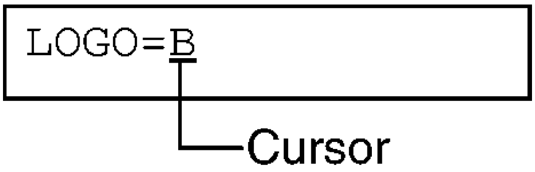
YOUR LOGO

4. Press .SET

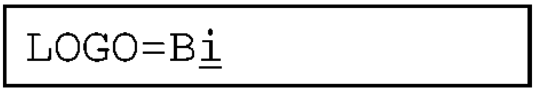
LOGO=

5. Enter your logo, up to 30 characters, by using the dial keypad.
Example: Bill

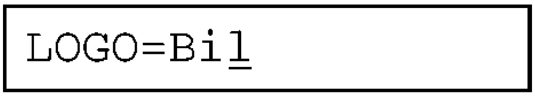
A. Press 2 2 times.


LOGO=B

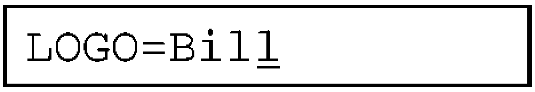
B. Press 4 6 times.


LOGO=Bi

C. Press 5 6 times.

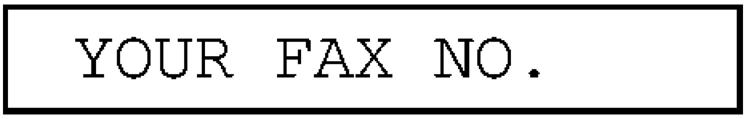

LOGO=Bil

D. Press ► to move the cursor to the next space and press 5 6 times.

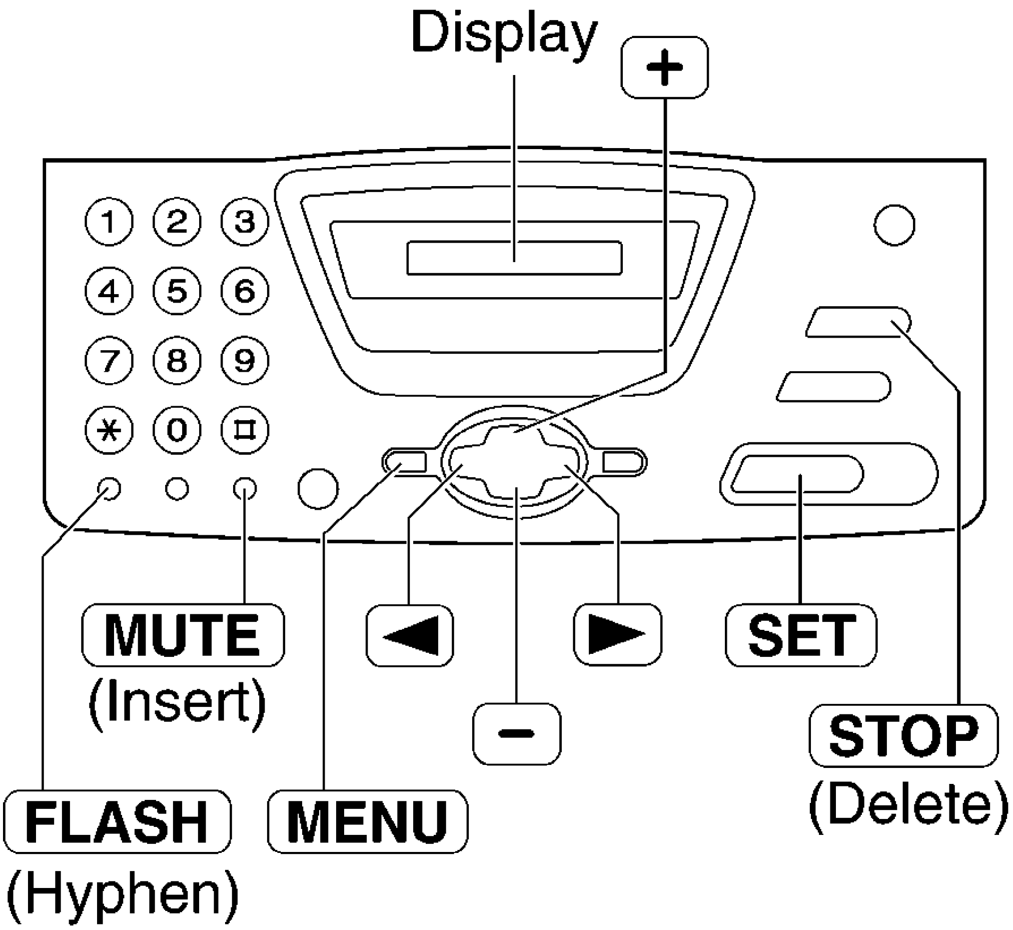

LOGO=Bill

6. Press SET.

- The next feature will be displayed.


YOUR FAX NO.

7. Press MENU.


Display
+
1
2
3
4
5
6
7
8
9
*
0
#
MUTE
(Insert)
◄
►
SET
−
STOP
(Delete)
FLASH
(Hyphen)
MENU

Note:

- You can enter your logo by pressing + or − in step (4). In this case, press ► to move the cursor.

To correct a mistake

-Press ◄ or ► to move the cursor to the incorrect character, and make the correction.

To delete a character

-Move the cursor to the character you want to delete and press STOP.

To insert a character

1. Press ◄ or ► to move the cursor to the position to where you want to insert the character.

2. Press MUTE to insert a space and enter the charact

1.14.3. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Pressing the dial keys will select a character as shown below.

Keys	Characters
①	1 [ ] { } + − / = , . _ ‘ : ; ? |
②	A B C a b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O m n o 6
⑦	P Q R S p q r s 7
⑧	T U V t u v 8
⑨	W X Y Z w x y z 9
⓪	Ñ 0 ( ) < > ! " # $ % & ¥ ∗ @ ^ ’ →
FLASH	**HYPHEN** button (To insert a hyphen.)
MUTE	**INSERT** button (To insert one character or one space.)
STOP	**Delete** button (To delete a character.)
▶	▶ key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
◀	◀ key (To move the cursor to the left.)

1.14.4. TO SELECT CHARACTERS USING ⊞ or ⊟

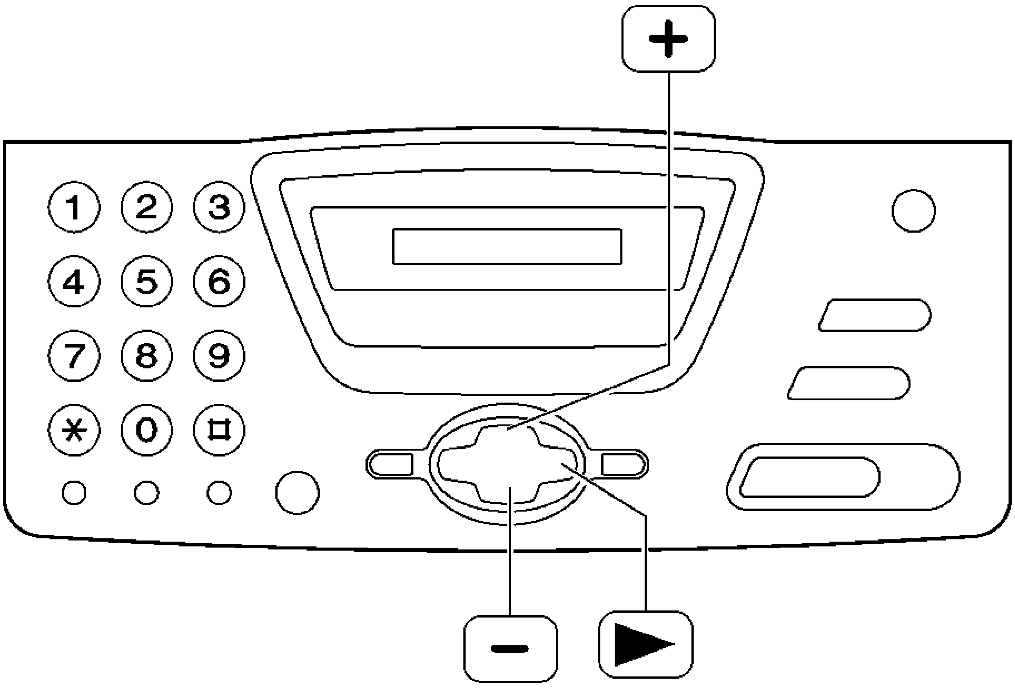
Instead of pressing the dial keys, you can select characters using ⊞ or ⊟.

1. Press ⊞ or ⊟ until the desired character is displayed.

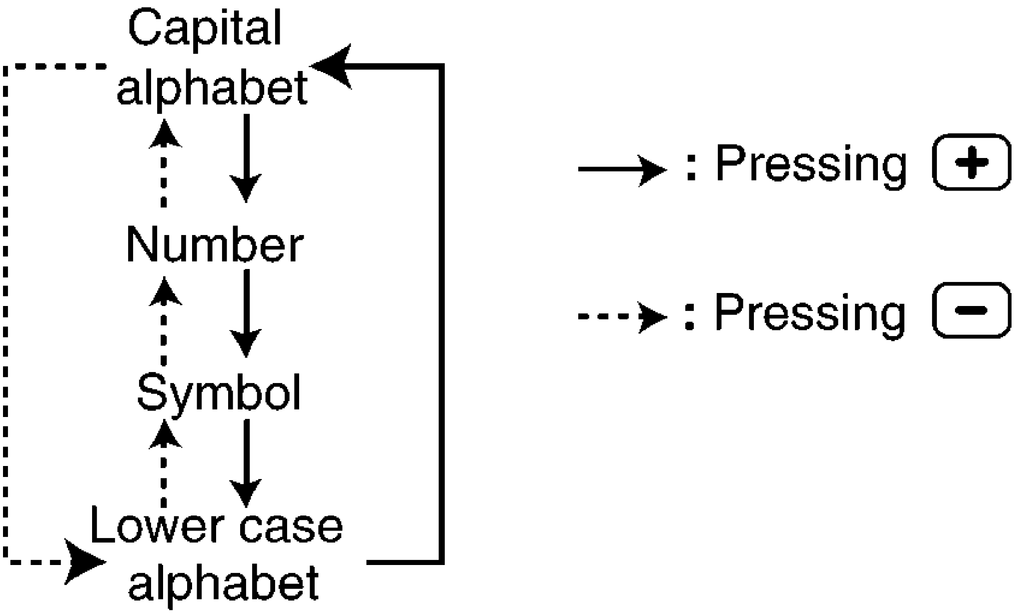
2. Press ▶ to move the cursor to the next space.

- The character displayed in step 1 is inserted.

3. Return to step 1 to enter the next character.


1
2
3
4
5
6
7
8
9
0
+
−
▶

Display order of characters


Capital alphabet
Number
Symbol
Lower case alphabet
: Pressing +
: Pressing −

1.14.5. SETTING THE DIAL LOCK

The dial lock feature prevents the unit from calls being made to any numbers, except for pre-stored emergency telephone numbers.

1. Press MENU .

Display:Refer to LCD MESSAGE ()

```
DIAL LOCK
```

2. Press SET .

```
CODE=
```

3. Enter yor PIN(Personal dentification Number) code, from 2 to 4 digits, using 0-9.
   If you want to release the PIN code, refer to #531 on the SERVICE FUNCTION TABLE ()

4. Press .SET

```
E01=
```

5. Enter an emergency telephone number, up to 30 digits, using the dial keypad.

6. Press SET.

   - The next feature will be displayed.

```
E02=
```

7. If necessary, enter the second emergency telephone number using the dial keypad.

   - If you do not need to enter, skip to step 8.

8. Press SET.

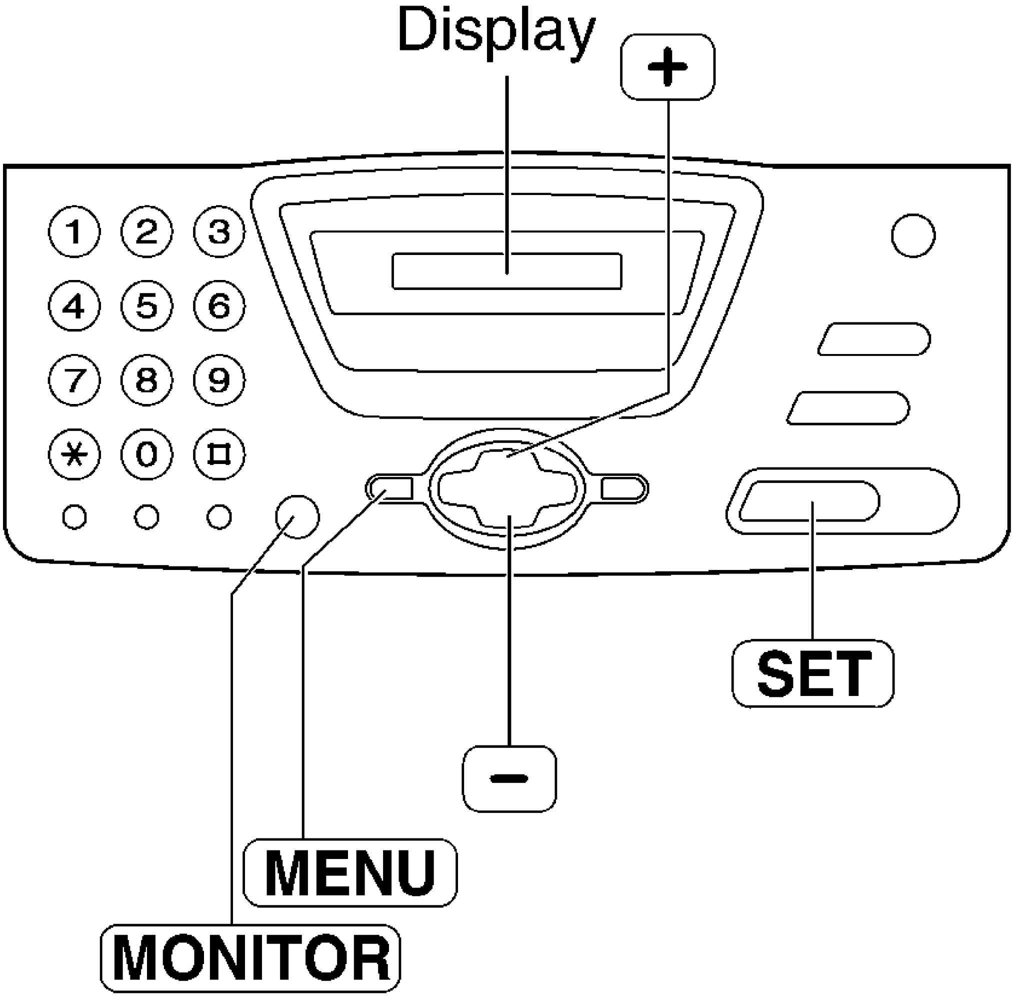
```
E03=
```

9. If necessary, enter the third emergency telephone number using the dial keypad.

   - If you do not need to enter, skip to step 10.

10. Press SET.

DIAL LOCK


Display
+
1
2
3
4
5
6
7
8
9
*
0
#
SET
−
MENU
MONITOR

Making an emergency call

1. Press **MONITOR** to lift the handset while the unit displays the following. / Display:

```
DIAL LOCK
```

-The display will show the following.

Example:

```
E01=0123456 [±]
```

2. Press **+** or **−** unitil the desired emergency telephone number is displayed. / Example:

```
E03=6543210 [±]
```

3. Press **SET**

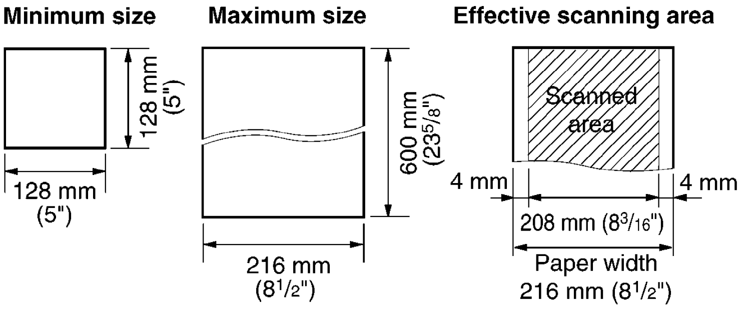
-The unit will start dialing automatically.

-If any documents are in the document entrance, the unit will start fax transmission..

To insert a character

1. Follow steps 1-3 on the left.
2. Press **SET**.

1.14.6. DOCUMENTS YOU CAN SEND


Minimum size

Maximum size

Effective scanning area

Document weight

Single sheet:
45 g/m^2 to 90 g/m^2
(12 lb. to 24 lb.)

Multiple sheets:
60 g/m^2 to 75 g/m^2
(16 lb. to 20 lb.)

Note:

- Remove clips, staples or other similar fasteners.
- Check that ink, paste or correction fluid has dried.
- Do not send the following types of documents:(Use copies for fax transmission.)
  - — Chemically treated paper such as carbon or carbonless duplicating paper
  - — Electrostatically charged paper
  - — Badly curled, creased or torn paper
  - — Paper with a coated surface
  - — Paper with a faint image
  - — Paper with printing on the opposite side that can be seen

through the front (i.e. newspaper)

- To transmit the document(s) with a width of less than A4 size (210mm), we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, than transmit the copied document.

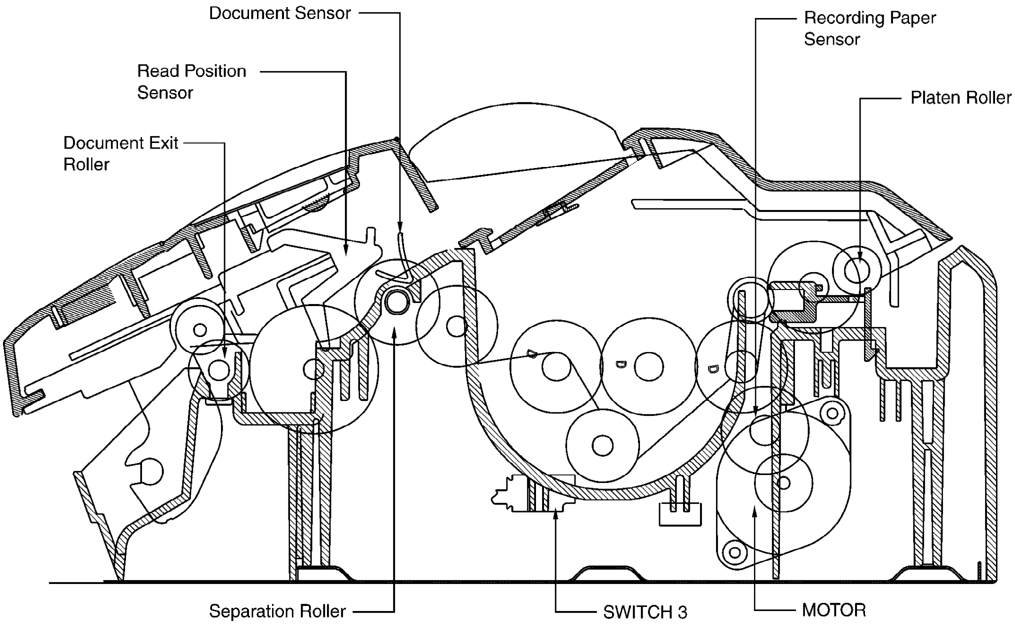
1.15. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.15.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance
   Inspect the equipment periodically and if necessary, clean any contaminated parts.
2. Check for breakdowns
   Look for problems and consider how they arose. / If the equipment can be still used, perform copying, self testing or communication testing.
3. Check equipment
   Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.
4. Determine causes
   Determine the causes of equipment problem by troubleshooting.
5. Equipment repairs
   Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.
6. Confirm normal operation of the equipment
   After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.
7. Record keeping
   Make a record of the measures taken to rectify the problem for future reference.

1.15.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS


Document Sensor
Read Position Sensor
Document Exit Roller
Recording Paper Sensor
Platen Roller
Separation Roller
SWITCH 3
MOTOR

1.15.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARI
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	See CLEANING (
3	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	See CLEANING (DISASSEMBLY INSTRUCTIONS
4	Glass	If the glass is dirty, clean the with a dry soft cloth.	See CLEANING (
5	Sensors	Document sensor (PS1), Read position sensor (PS2), Recording paper/cover open sensor (SW1) Jam sensor (SW3).	See SENSOR SE and SENSORS A SWITCHES () .
6	Abnormal, wear and tear or loose parts	If the glass is dirty, clean them with a dry soft cloth.	—

1.15.2.2. MAINTENANCE CYCLE

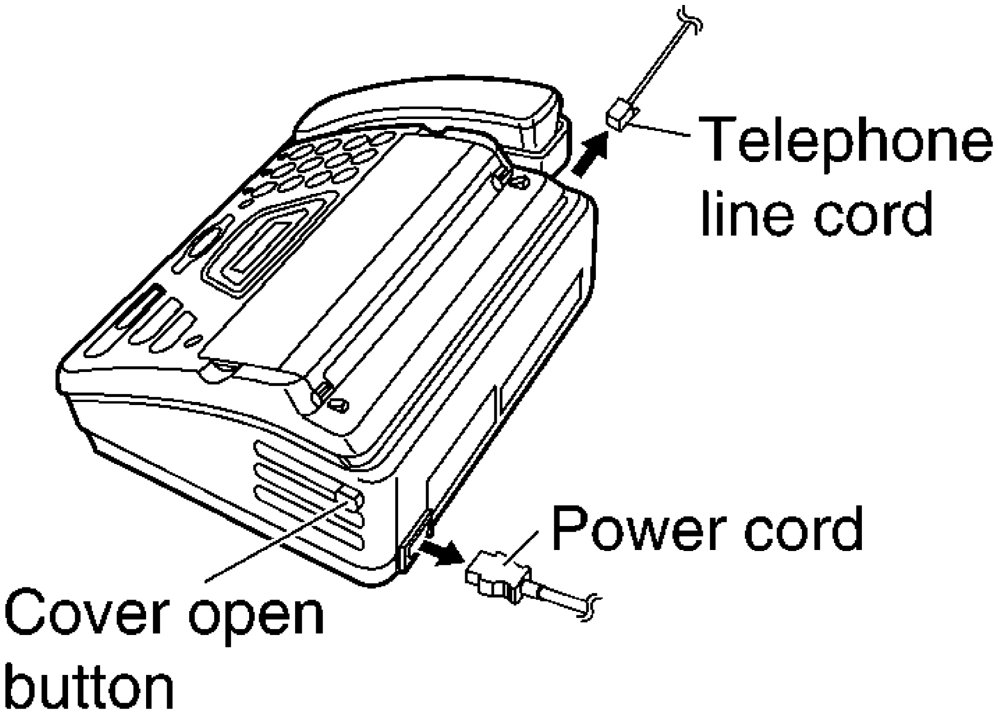
No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 72)	3 months	7 years* (100,000 documents)	See HOW□@TO REMOVE THE BLOCK AND SEPARATION RO
2	Separation Rubber (Ref. No. 21)	3 months	7 years* (100,000 documents)	See HOW□@TO REMOVE THE BLOCK AND SEPARATION RO
3	Feed Rollers (Ref. No. 58)	3 months	7 years* (100,000 documents)	See HOW□@TO REMOVE THE BLOCK AND SEPARATION RO
4	Thermal Head (Ref. No. 53)	3 months	7 years* (100,000 documents)	See HOW□@TO REMOVE THE BLOCK AND SEPARATION RO

1.15.3. CLEANING

1.15.3.1. DOCUMENT FEEDER

If misfeeding occurs frequently or if dirty patterns or black bands or white bands appear on a copied or transmitted document or the original of a copied document, clean the document feeder.

1. **Disconnect the power cord and the telephone line cord.**
2. **Open the cover by pressing the cover open button.**

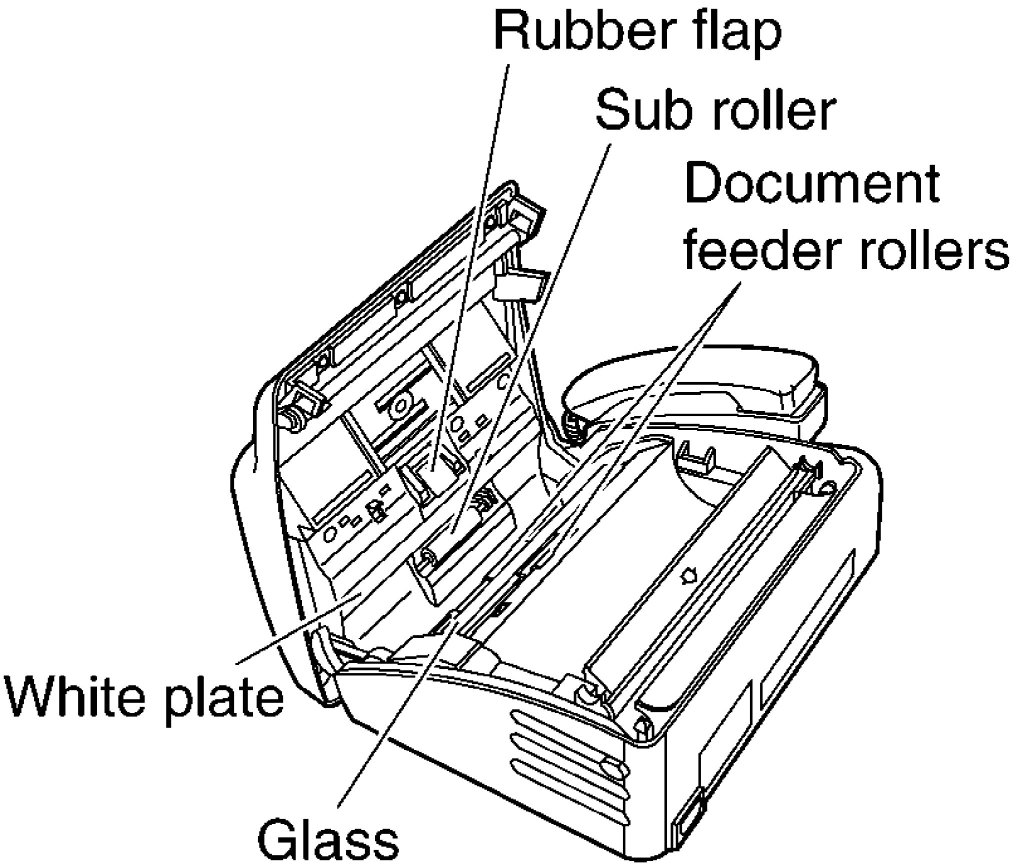


3. **Clean the document feeder rollers, sub roller and rubber flap with**

a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.

4. **Clean the white plate and glass with a soft dry cloth.**
5. **Close the cover securely by pushing down on both ends.**
6. **Connect the power cord and the telephone line cord.**

Caution:
Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.



1.15.3.2. THE THERMAL HEAD

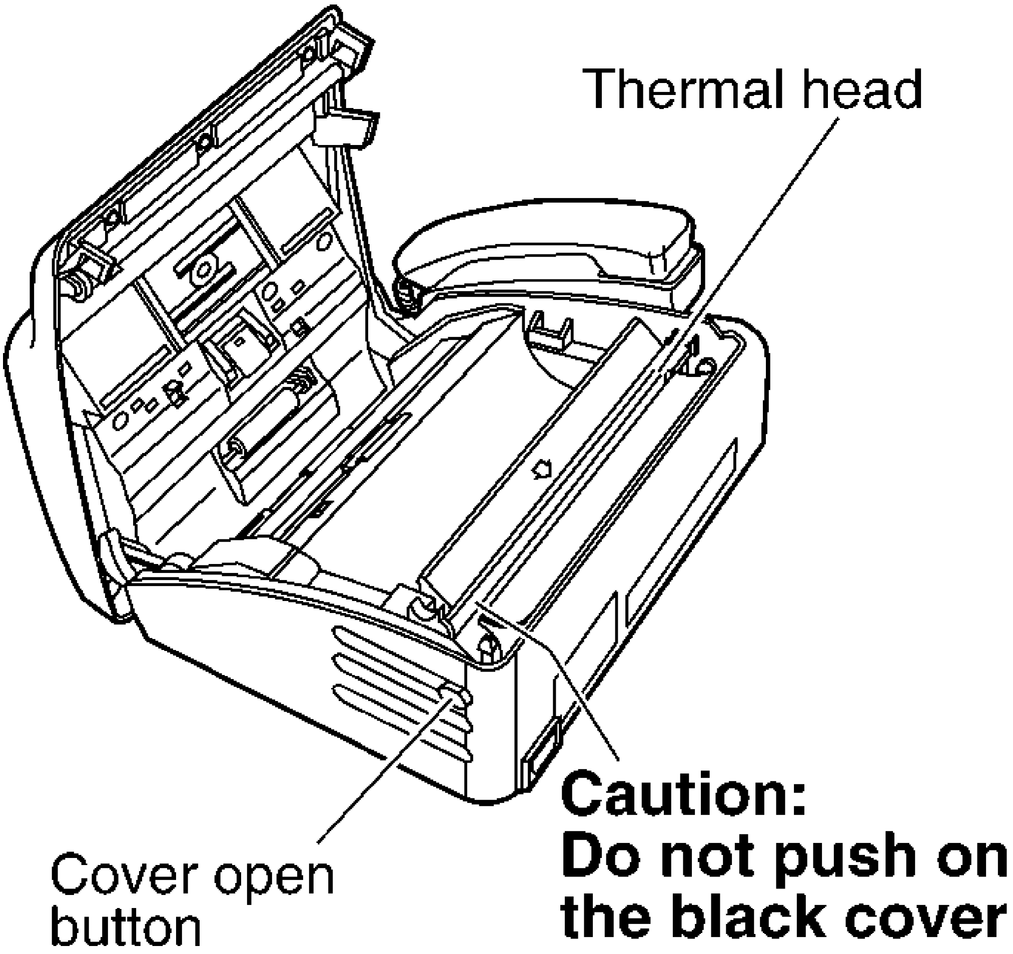
If dirty patterns or black bands appear on a copied or received document, clean the thermal head.

1. **Disconnect the power cord and the telephone line cord.**
2. **Open the cover by pressing the cover open button.**
3. **Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.**

4. Close the cover securely by pushing down on both sides.

5. Connect the power cord and the telephone line cord.

Caution:
To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly.


Thermal head
Caution:
Do not push on the black cover
Cover open button

2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the

specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.

2. **Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).**
   If the problem occurs randomly, check it very carefully.
3. **When connecting the AC power cord with the unit case and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.**
4. **After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.**
5. **Always test to verify that the unit is working normally.**

2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use:

1. **press HELP.**
2. **press ◄ or ► until the desired item is displayed.**
3. **press SET.**

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, the following messages will appear on the display.

Refer to LCD MESSAGE ()

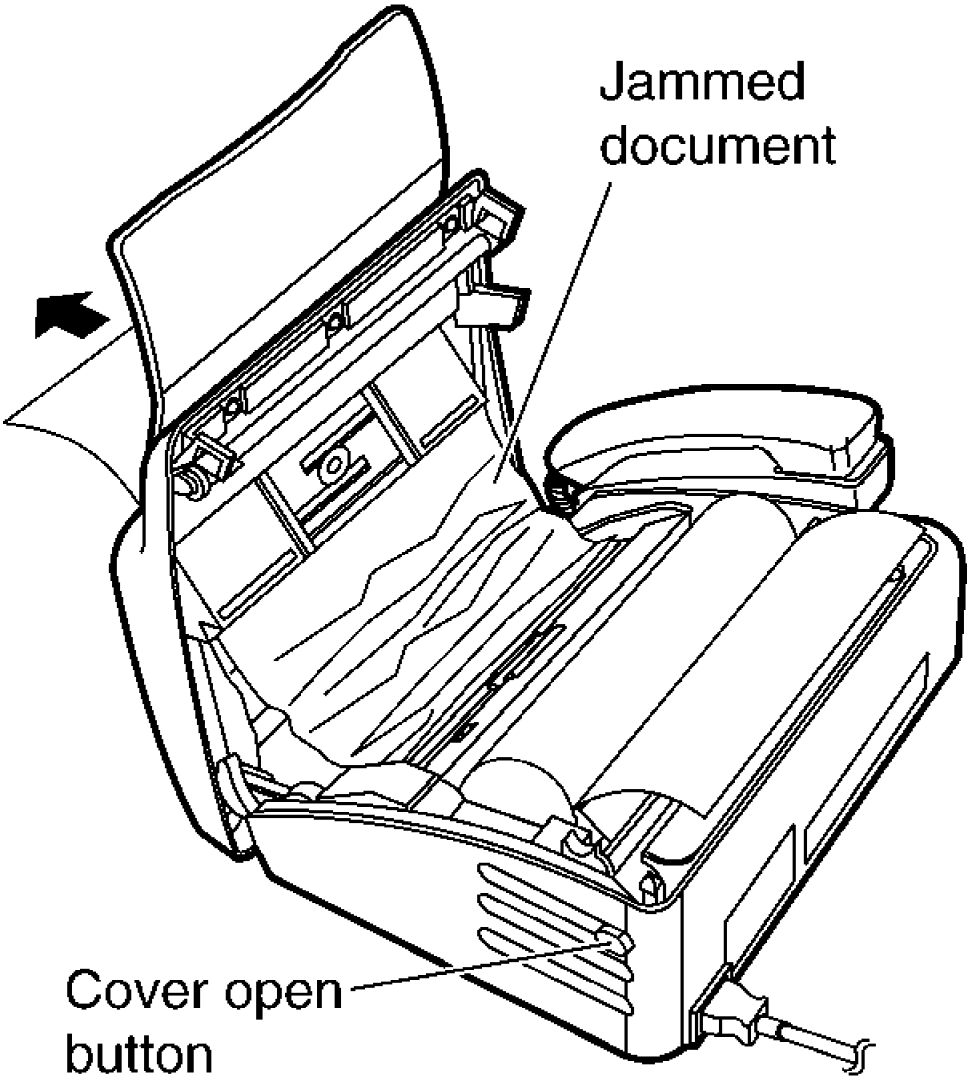
DISPLAY MESSAGE	CAUSE AND SOLUTION
CALL SERVICE 1	-There is something wrong with the unit. Contact our service personnel. / [This error is displayed whe thermal head does not warm up. Check the thermistor on the thermal head and connector lead.]
CALL SERVICE 2	-This message appears when the gear is not in an idle state. Check the GEAR BLOCK.
CHECK COVER	-The cover is open. Close it.
CHECK DOCUMENT	-The document was not fed into the unit properly. Reinsert the document. If misfeeding occurs freque the document feeder rollers (Refer to DOCUMENT FEEDER ()) and try again. (Refer to DOCUMENT JA -Attempted to transmit a document longer than 600 mm. Press STOP to remove the document. Divide the document into two or more sheets and try again.
CHECK MEMORY	-Memory (telephone numbers, parameters, etc.) has been erased. Re-program. / [The backup battery the digital board may be low or dead, so check it.]
NO RESPONSE	-The other part'y fax machine is busy or has run out of recording paper. Try again.
OUT OF PAPER	-The unit has run out of recording paper. Install a recording paper roll. / (Refer to INSTALLING THE RE PAPER ().)
POLLING ERROR	-The other part'y fax machine dose not provide the polling function. Check with the other party.
REDIAL TIME OUT	-The other part'y fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	-The document is jammed. Remove the jammed document. -[Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer t DOCUMENT JAMS (SENDING) ().)
TRANSMIT ERROR	-A transmission error occurred. Try again.
UNIT OVERHEATED	-The unit is too hot. Let the unit cool down. / [If many copies are nearly all black, this message will be When this occure, open the front cover and let the unit cool down.]

Notes: The explanations given in the [ ] are for servicemen only. /

2.2.1. DOCUMENT JAMS (SENDING)

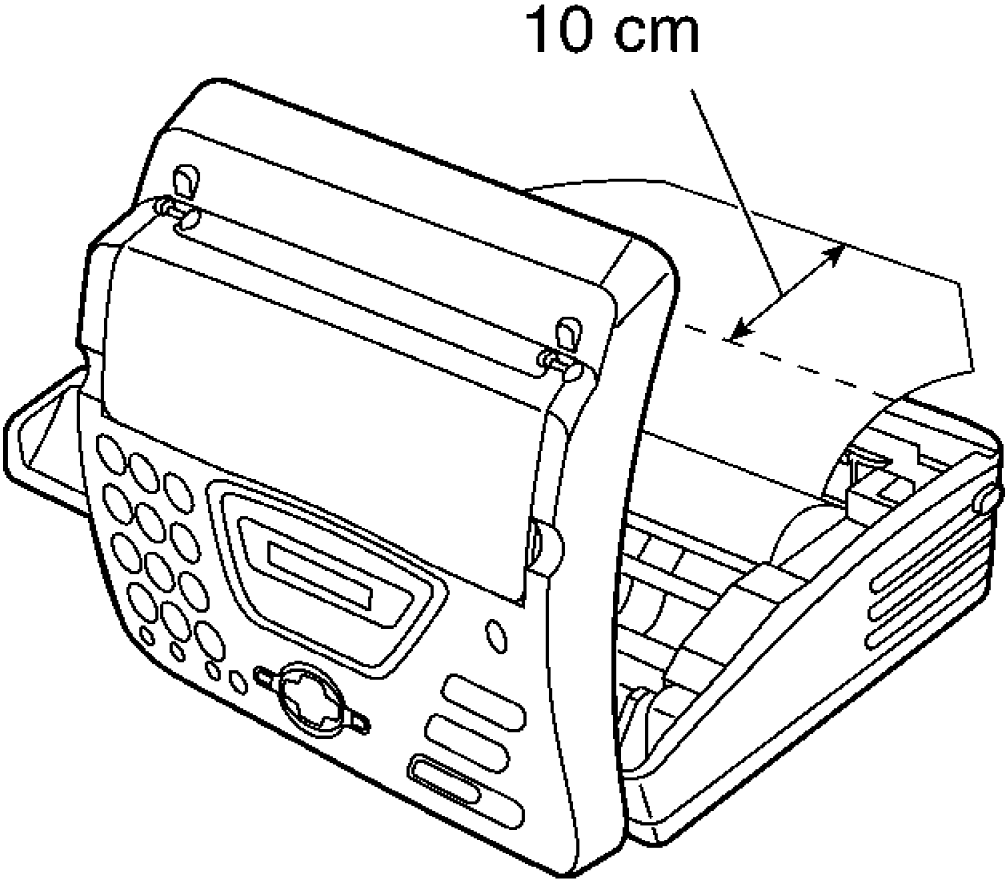
If the unit does not release the document during feeding, remove the jammed document as follows.

1. **Open the cover by pressing the cover open button.**
2. **Remove the jammed document carefully.**

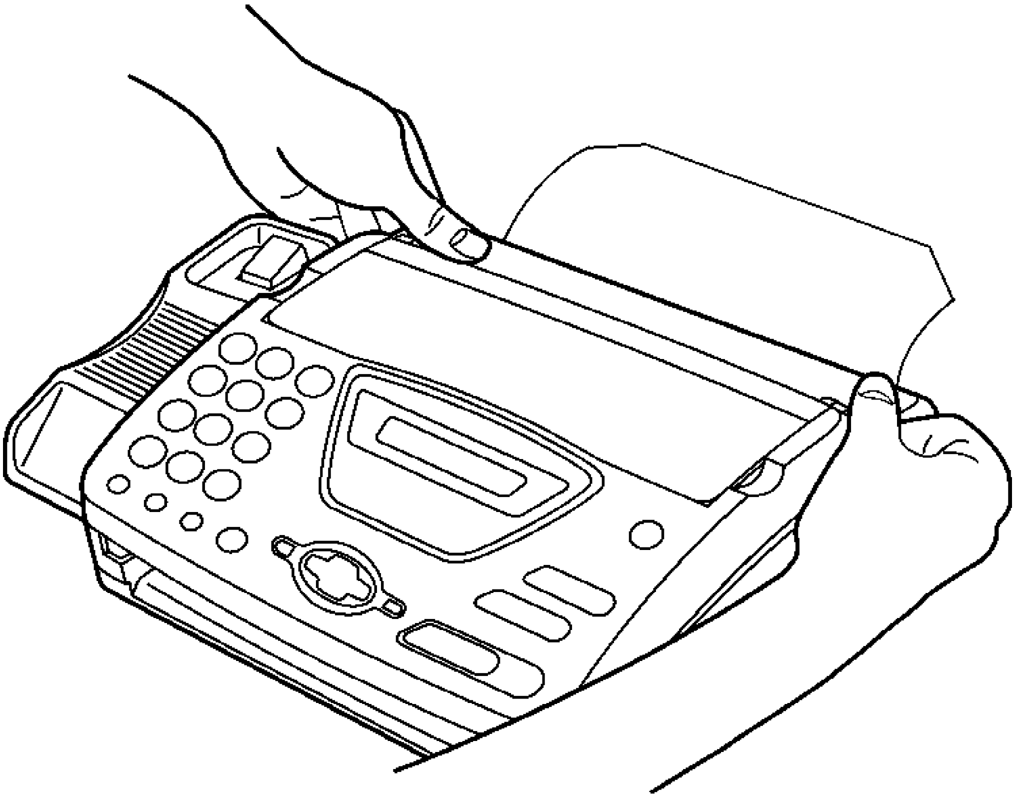

Jammed document
Cover open button

3. **Pull the leading edge of the recording paper approximately 10 cm (4 inches) out of the unit.**

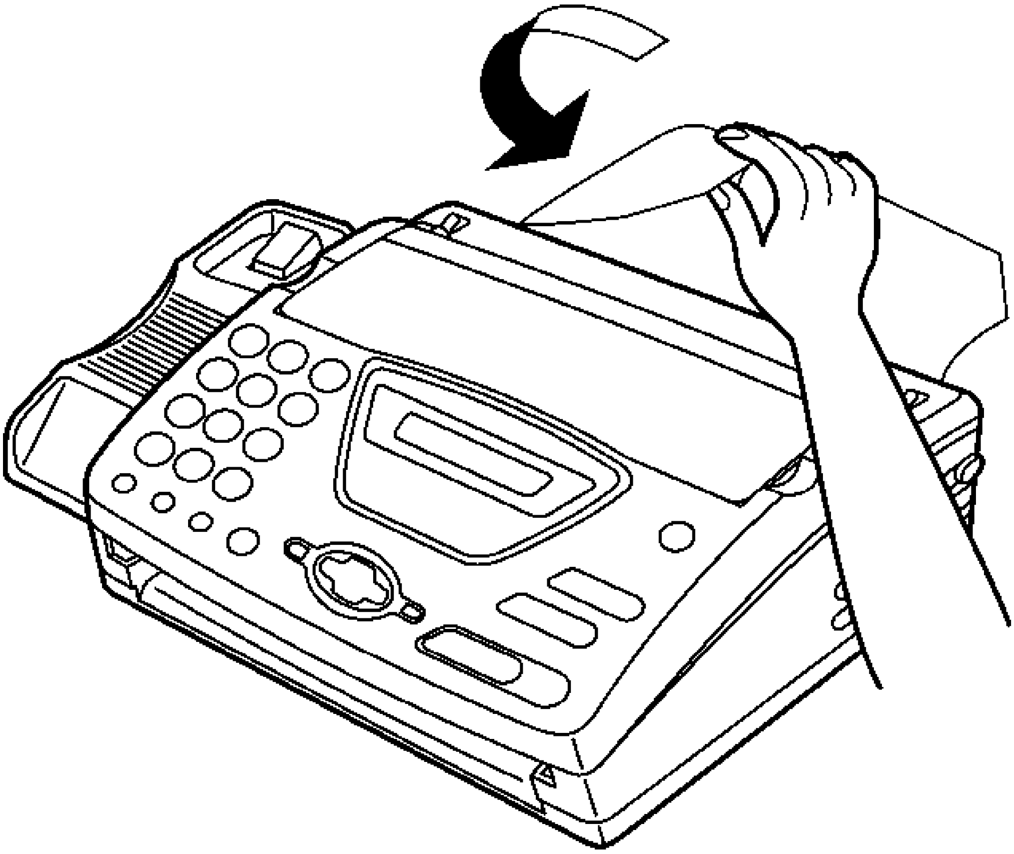
   - **Make sure that there is no slack in the paper roll.**



4. **Close the cover securely by pushing down on both sides.**



5. Tear off the excess paper by pulling it towards you.



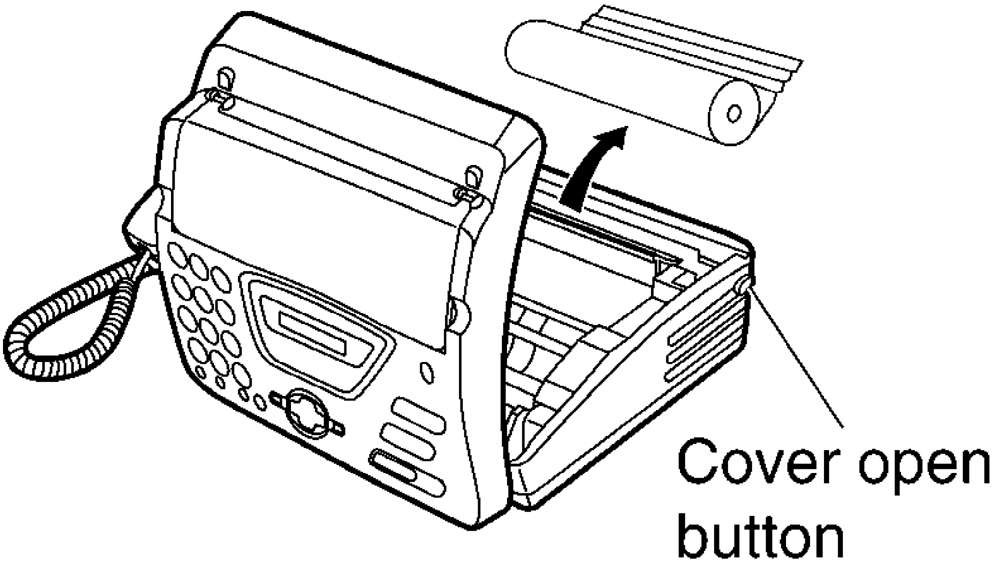
Note:

- Do not pull out the jammed document forcibly before opening the cover.

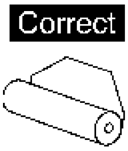
2.2.2. RECORDING PAPER JAM

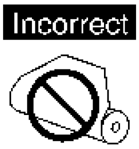
If the unit dose not eject any recording paper during fax reception or copying, the recording paper has jammed. Remove the jammed paper as shown below.

1. **Open the cover by pressing the cover open button and remove the recording paper roll.**

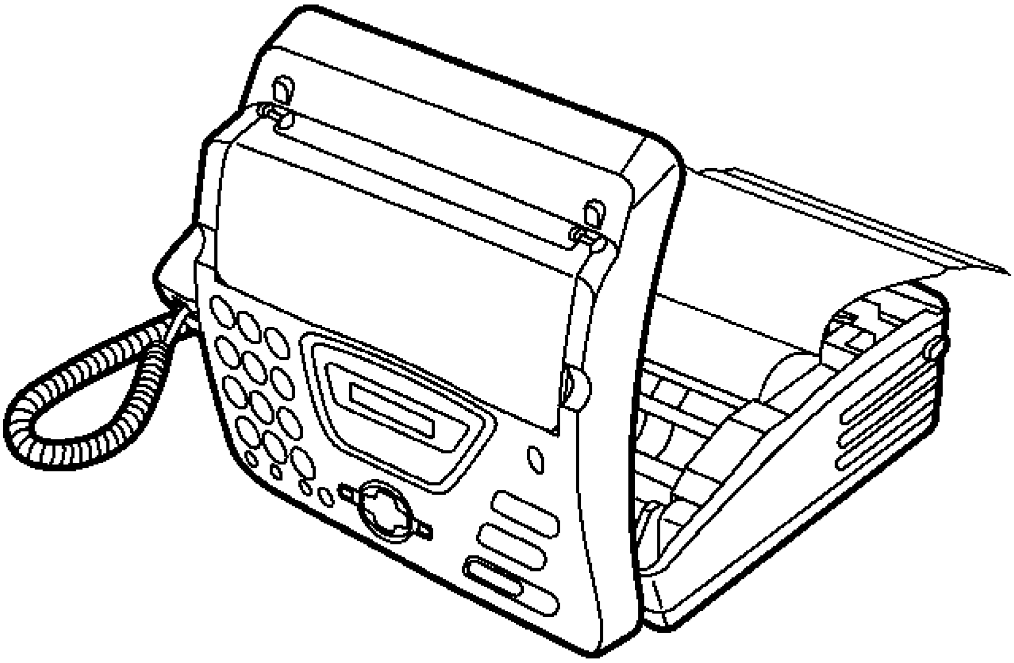

Cover open button

2. **Replace the recording paper roll in the proper direction, and pull the leading edge of the paper approximately 10 cm (4 inches) out of the unit.**

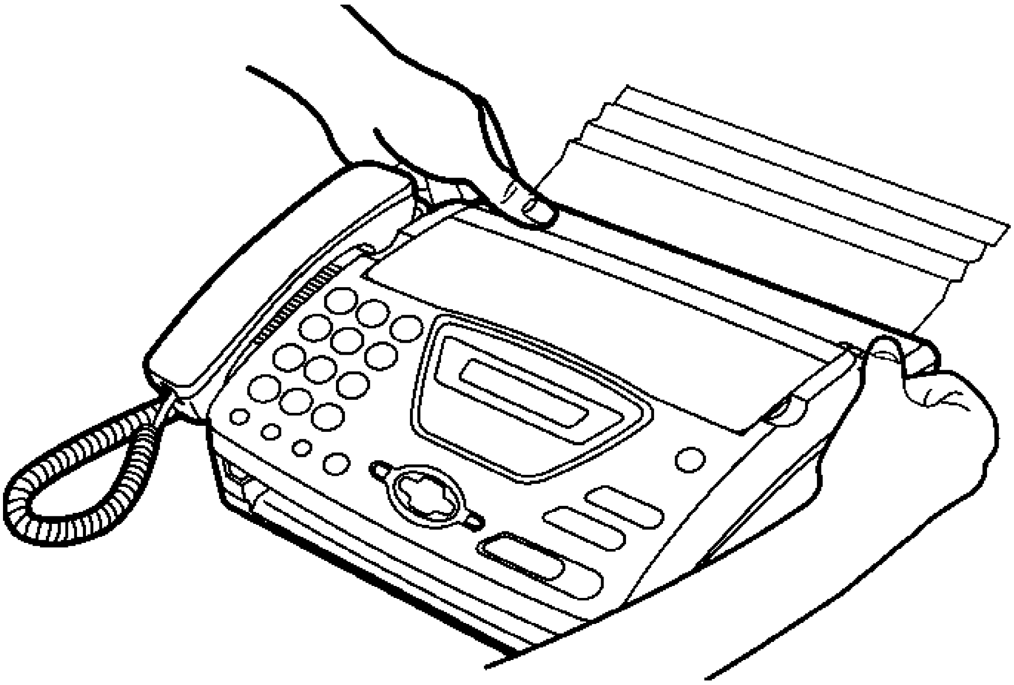




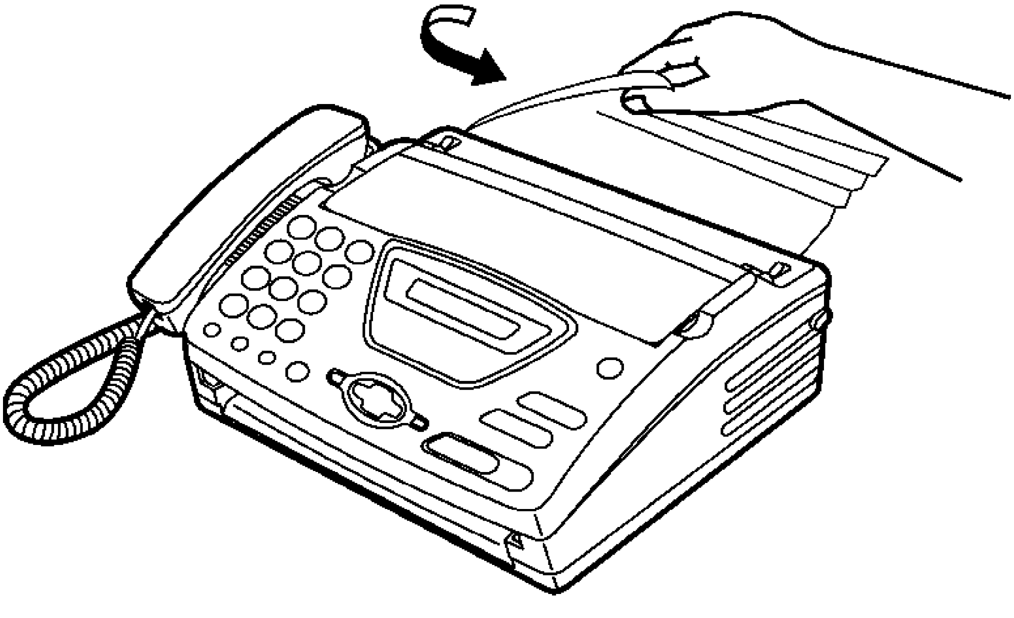
- Make sure that there is no slack in the paper roll.



3. **Close the cover securely by pushing down on both sides.**



4. **Tear off the excess paper by pulling it towards you.**



Note:

- When the power cord is connected, every time you close the cover a message will be printed. If the recording paper is set to the

wrong side, a message will not be printed. Install the paper correctly.

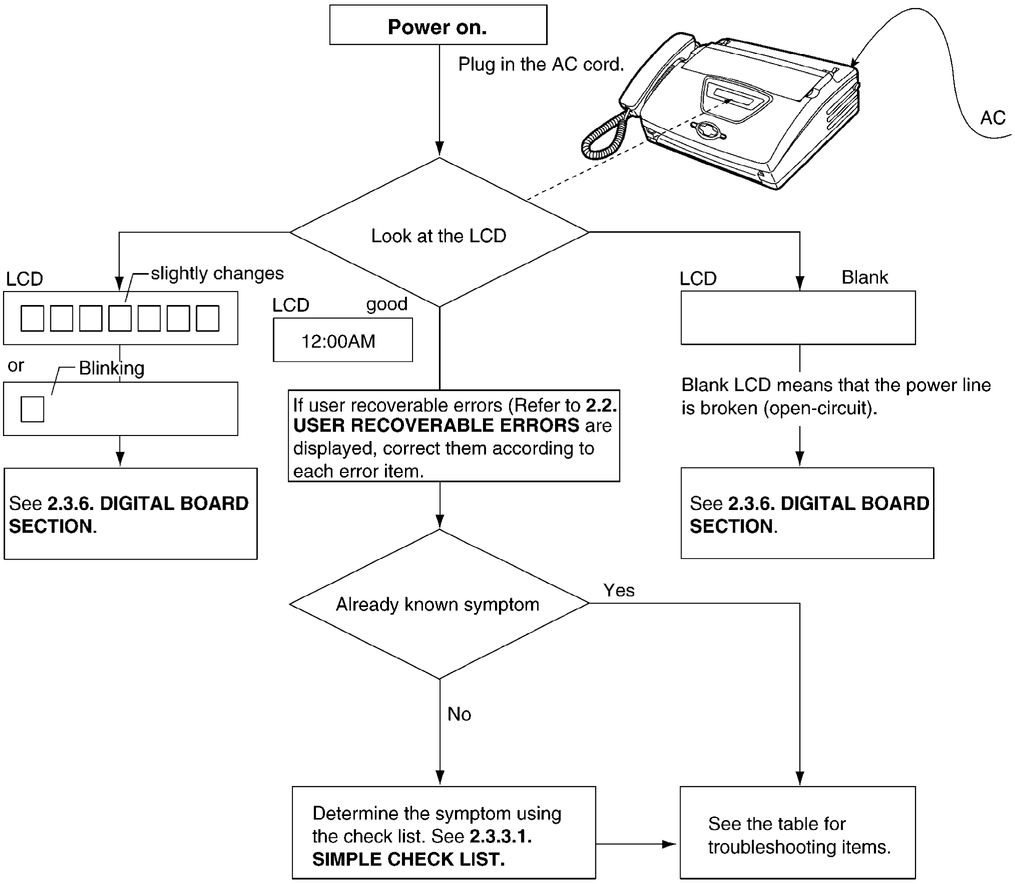
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting guide provides a logical path of deduction to assist in locating a fault and suggests methods of restoring the unit to full working condition. Use the reported symptoms of the fault to determine the best troubleshooting method. Even difficult faults can be tracked to a specific block or area, for example, the "Digital Board" or "Image Sensor". / A variety of fault descriptions from customers often point to the same area and, for this reason, careful analysis of the reported symptoms is required. After every repair, test all functions to ensure no problems are evident.

2.3.2. STARTING TROUBLESHOOTING

Select the appropriate troubleshooting method according to the symptoms.



Power on.
Plug in the AC cord.
AC
Look at the LCD
LCD
slightly changes
or
Blinking
LCD
good
12:00AM
LCD
Blank
Blank LCD means that the power line is broken (open-circuit).
If user recoverable errors (Refer to 2.2. USER RECOVERABLE ERRORS are displayed, correct them according to each error item.
See 2.3.6. DIGITAL BOARD SECTION.
See 2.3.6. DIGITAL BOARD SECTION.
Already known symptom
Yes
No
Determine the symptom using the check list. See 2.3.3.1. SIMPLE CHECK LIST.
See the table for troubleshooting items.

CROSS REFERENCE:

USER RECOVERABLE ERRORS ()

SIMPLE CHECK LIST ()

DIGITAL BOARD SECTION ()

2.3.3. TROUBLESHOOTING ITEMS TABLE

FUNCTION	SYMPTOM	REFERENCE
Printing	Skewed receiving image	See SKEWED RECEIVING IMAGE ()
	Expanded print	See EXPANDER PRINT (WHEN PRINTI
	Image is distorted	See IMAGE IS DISTORTED (WHEN PR
	Black or White vertical lines appear.	See BLACK OR WHITE VERTICAL LIN APPEAR ()
ADF (Auto Document Feeder)	No feed	See NO DOCUMENT FEED ()
	Paper jam	See DOCUMENT JAM ()
	Multiple feed	See MULTIPLE FEED ()
	Skew	See SKEW ()
Abnormal mechanical sound	Abnomal sound from the product	See WHEN COPYING OR PRINTING, A ABNORMAL SOUND IS HEARD FROM ()
Power supply	Voltage output is abnormal.	See POWER SUPPLY BOARD SECTIO
Operation panel	keys are not accepted.	See OPERATION BOARD SECTION ()
Sensor	If the electric circuit is the cause, “REMOVE DOCUMENT” will be displayed.	See SENSOR SECTION ()
Communication FAX, TEL (Analog/Digital board)	Cannot communicate by fax.	See DEFECTIVE ITS (INTEGRATED TE SYSTEM) SECTION ()
	Error code is displayed.	See HOW TO OUTPUT THE JOURNAL ()
	Cannot talk.	See ANALOG BOARD SECTION ()
	DTMF tone doesn’t work.	
	Handset/Monitor sound, volume	

2.3.3.1. SIMPLE CHECK LIST

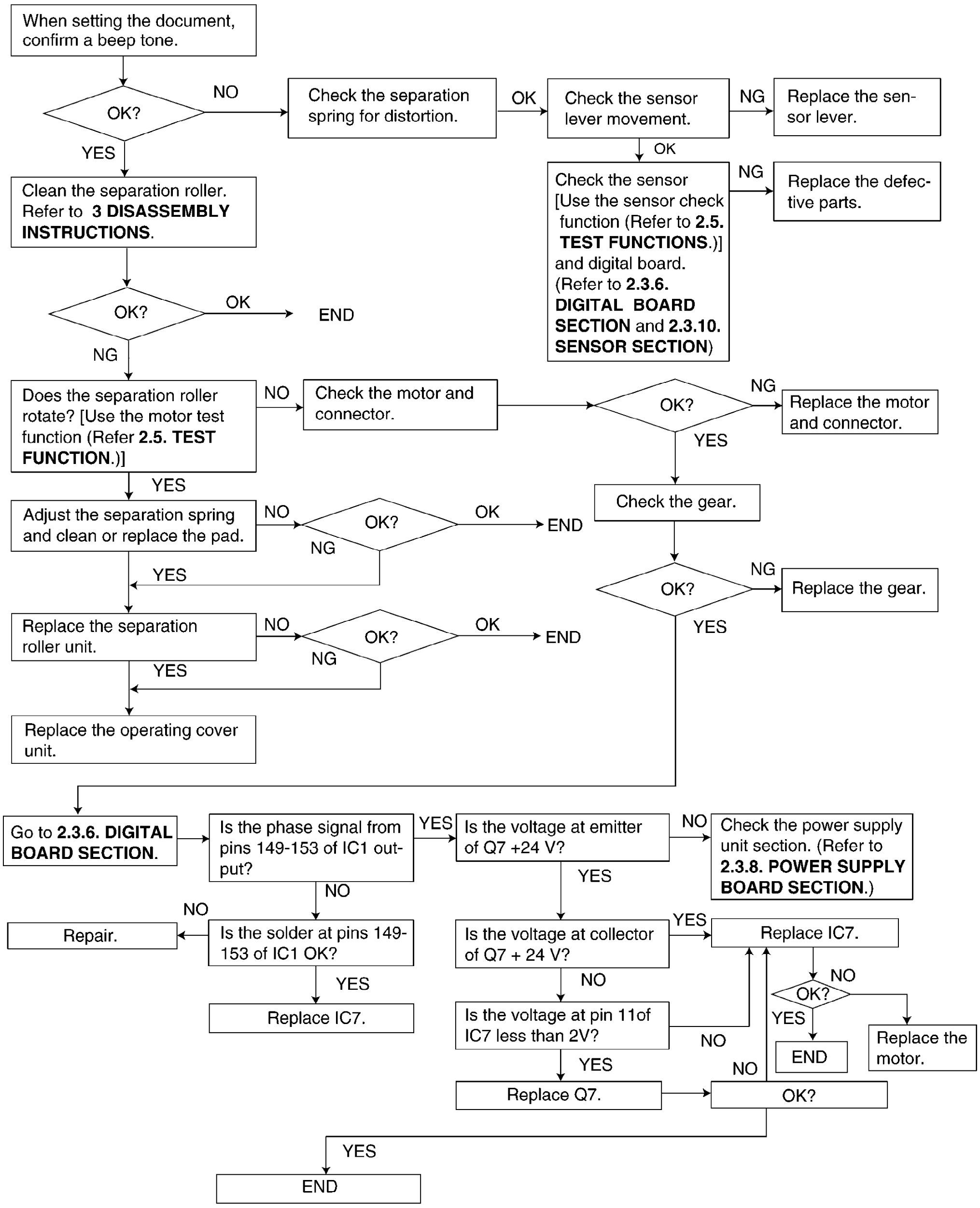
SERIAL NO.		DATE	
FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation	FINE mode	OK / NG	
	PHOTO mode	OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	Monitor sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
Operation Panel	Key check	OK / NG	Service code #561 (Refer to TEST FUNCTION
	LCD check	OK / NG	Service code #558 (Refer to TEST FUNCTION
Sensor	Sensor check	OK / NG	Service code #815 (Refer to TEST FUNCTION
Clock		OK / NG	Is the time kept correctly? Check with another clock.
External Telephone	Handset transceiver/receiver	OK / NG	
	Remote control	OK / NG	Change to FAX receiving I pressing * 9. (Refer to code no. 041.on PROGRAM MODE TABLE

Note:

- Check according to the sevvice code referring to the TEST FUNCTIONS ().

2.3.4. ADF (AUTO DOCUMENT FEED) SECTION

2.3.4.1. NO DOCUMENT FEED


When setting the document, confirm a beep tone.
OK?
NO
YES
Check the separation spring for distortion.
OK
Check the sensor lever movement.
NG
Replace the sensor lever.
OK
Check the sensor [Use the sensor check function (Refer to 2.5. TEST FUNCTIONS.)] and digital board. (Refer to 2.3.6. DIGITAL BOARD SECTION and 2.3.10. SENSOR SECTION)
NG
Replace the defective parts.
Clean the separation roller. Refer to 3 DISASSEMBLY INSTRUCTIONS.
OK?
OK
END
NG
Does the separation roller rotate? [Use the motor test function (Refer 2.5. TEST FUNCTION.)]
NO
Check the motor and connector.
OK?
NG
Replace the motor and connector.
YES
Check the gear.
OK?
NG
Replace the gear.
YES
YES
Adjust the separation spring and clean or replace the pad.
NO
OK?
OK
END
NG
YES
Replace the separation roller unit.
NO
OK?
OK
END
NG
YES
Replace the operating cover unit.
Go to 2.3.6. DIGITAL BOARD SECTION.
Is the phase signal from pins 149-153 of IC1 output?
YES
Is the voltage at emitter of Q7 +24 V?
NO
Check the power supply unit section. (Refer to 2.3.8. POWER SUPPLY BOARD SECTION.)
NO
YES
NO
Repair.
Is the solder at pins 149-153 of IC1 OK?
YES
Replace IC7.
Is the voltage at collector of Q7 + 24 V?
YES
Replace IC7.
NO
OK?
YES
END
Replace the motor.
NO
Is the voltage at pin 11of IC7 less than 2V?
NO
YES
NO
Replace Q7.
OK?
YES
END

CROSS REFERENCE:

DIGITAL BOARD SECTION ()

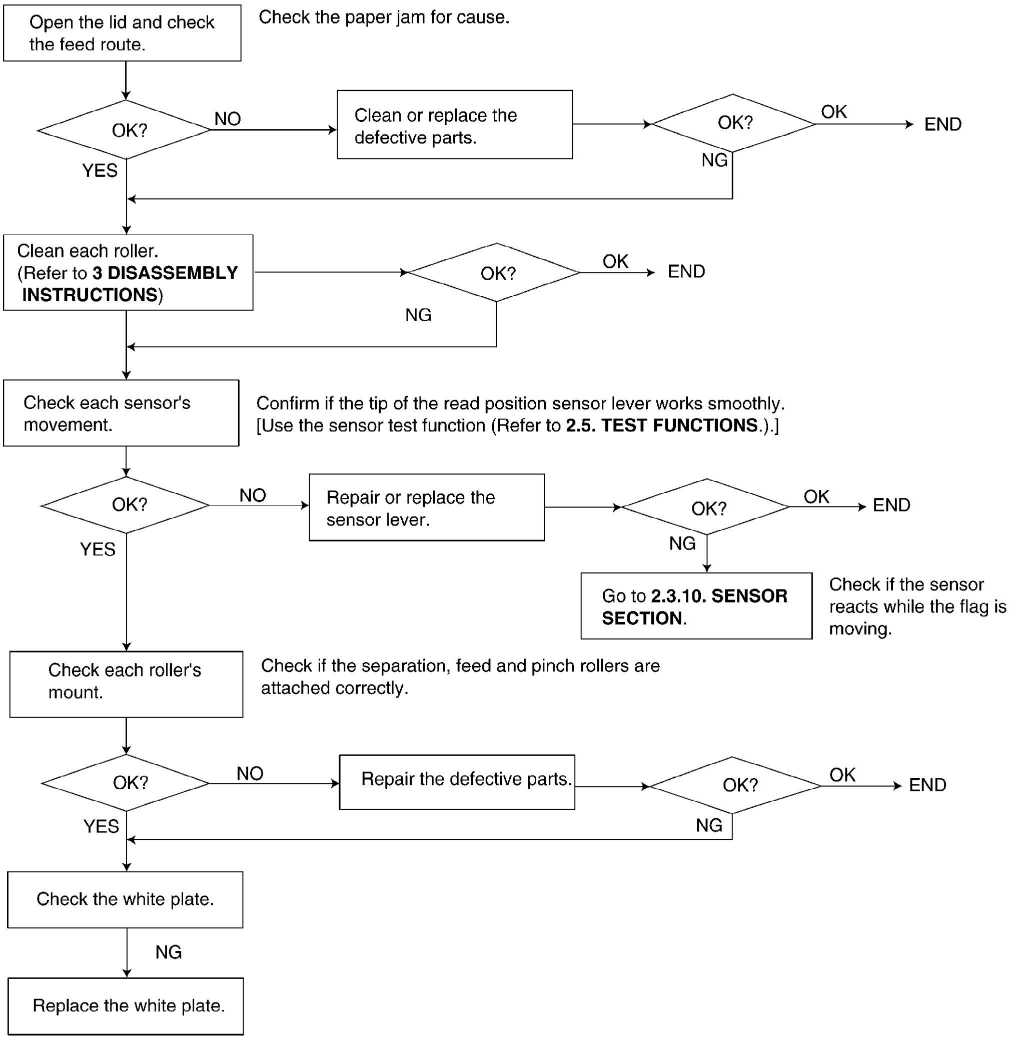
POWER SUPPLY BOARD SECTION ()

SENSOR SECTION ()

TEST FUNCTIONS ()

DISASSEMBLY INSTRUCTIONS ()

2.3.4.2. DOCUMENT JAM

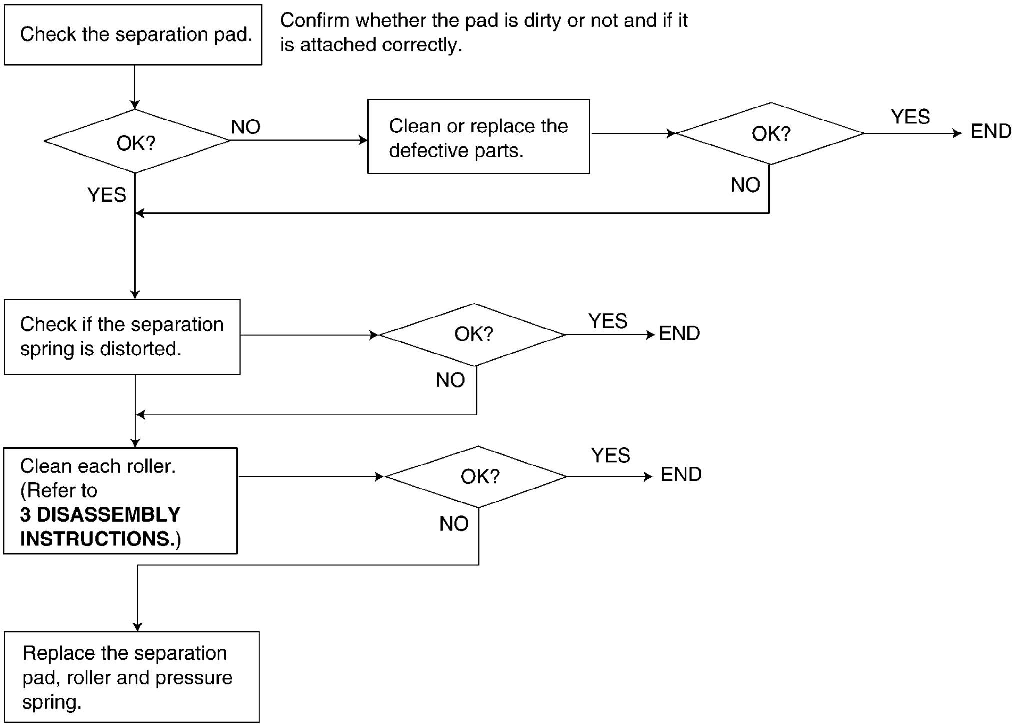

Open the lid and check the feed route.
Check the paper jam for cause.
OK?
NO
YES
Clean or replace the defective parts.
OK?
OK
END
NG
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS)
OK?
OK
END
NG
Check each sensor's movement.
Confirm if the tip of the read position sensor lever works smoothly. [Use the sensor test function (Refer to 2.5. TEST FUNCTIONS.).]
OK?
NO
YES
Repair or replace the sensor lever.
OK?
OK
END
NG
Go to 2.3.10. SENSOR SECTION.
Check if the sensor reacts while the flag is moving.
Check each roller's mount.
Check if the separation, feed and pinch rollers are attached correctly.
OK?
NO
YES
Repair the defective parts.
OK?
OK
END
NG
Check the white plate.
NG
Replace the white plate.

CROSS REFERENCE:

SENSOR SECTION ()

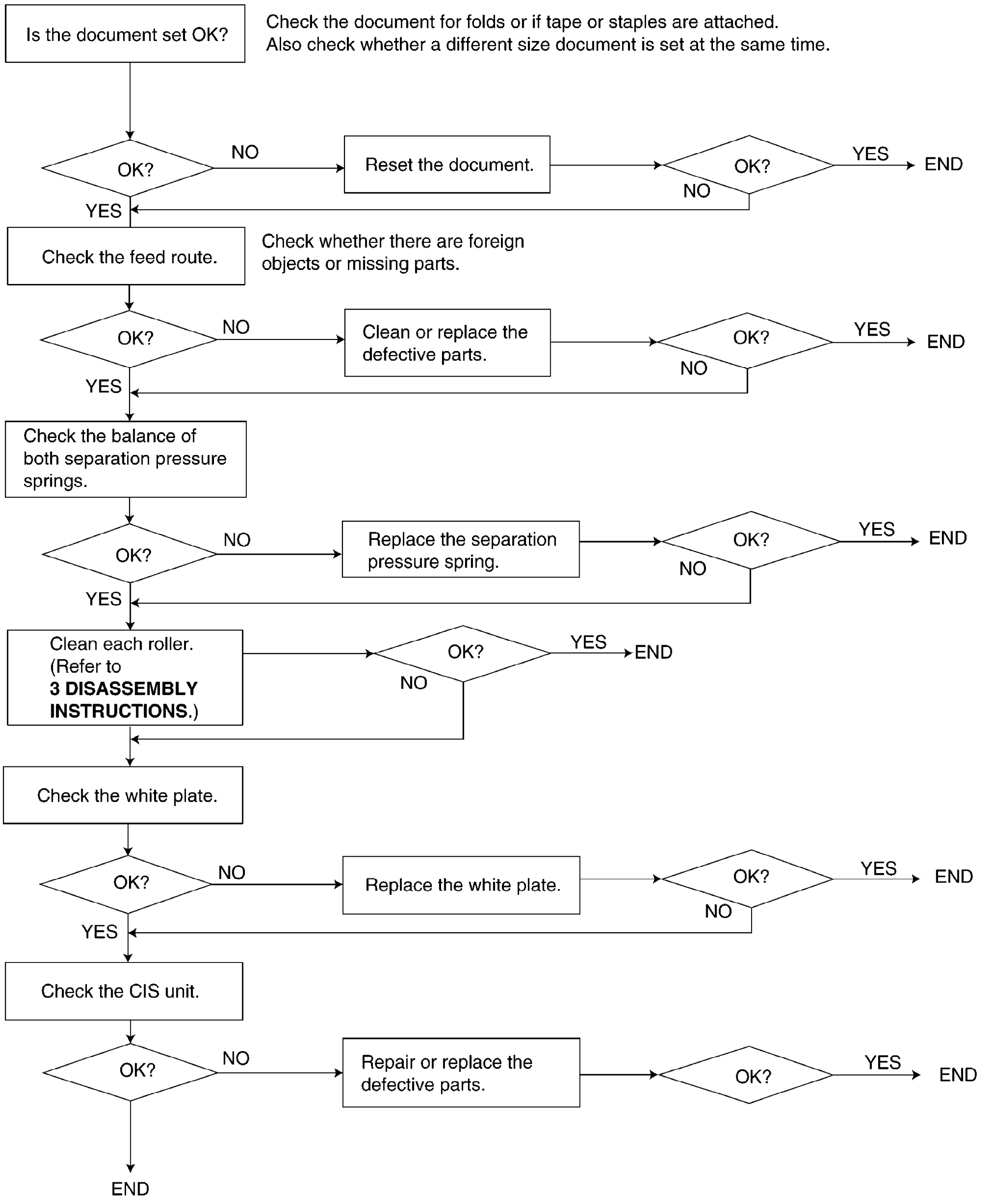
DISASSEMBLY INSTRUCTIONS ()

2.3.4.3. MULTIPLE FEED


Check the separation pad.
Confirm whether the pad is dirty or not and if it is attached correctly.
OK?
NO
YES
Clean or replace the defective parts.
OK?
YES
END
NO
Check if the separation spring is distorted.
OK?
YES
END
NO
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS.)
OK?
YES
END
NO
Replace the separation pad, roller and pressure spring.

CROSS REFERENCE:
DISASSEMBLY INSTRUCTIONS ()

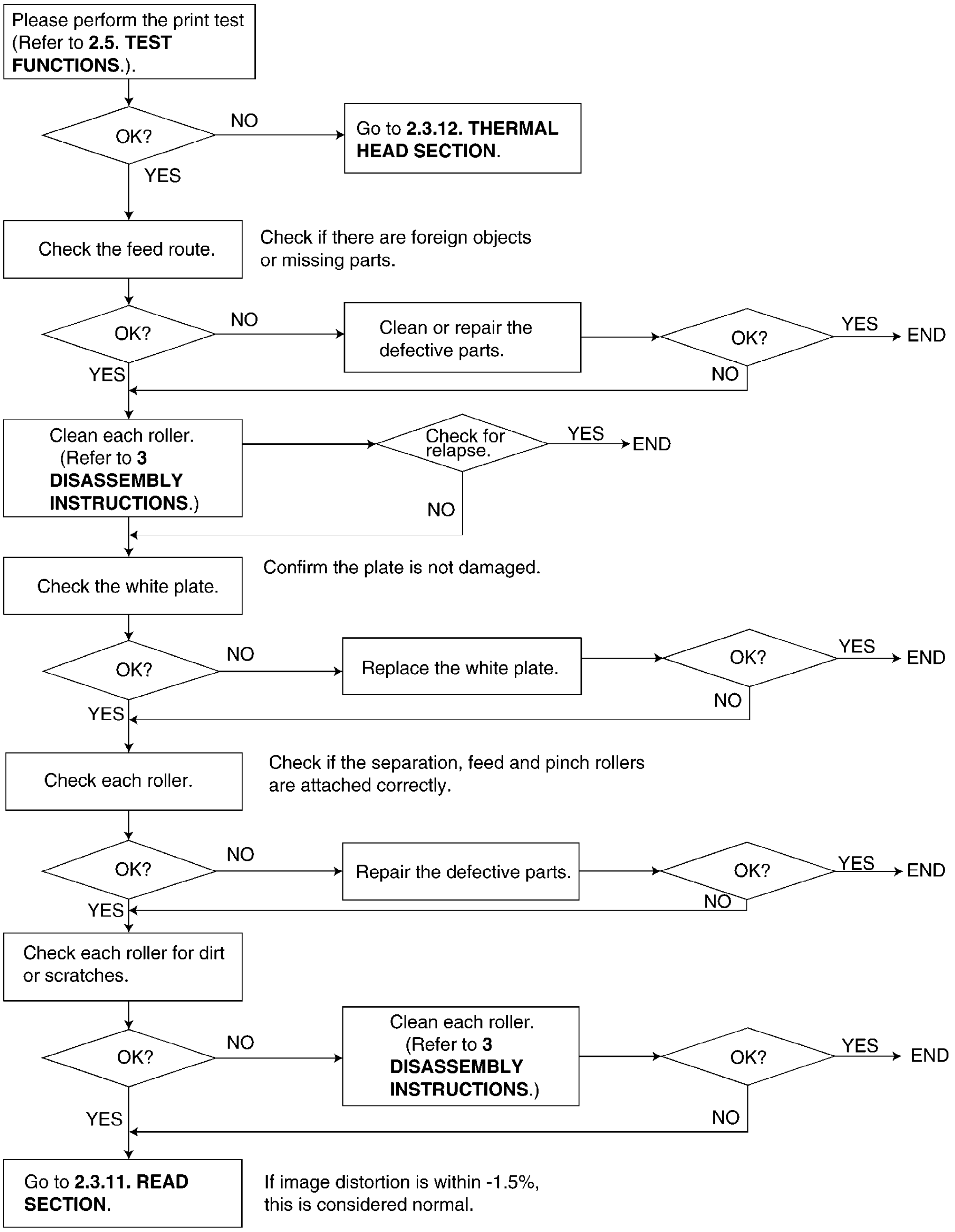
2.3.4.4. SKEW


Is the document set OK?
Check the document for folds or if tape or staples are attached.
Also check whether a different size document is set at the same time.
OK?
NO
Reset the document.
OK?
YES
END
NO
YES
Check the feed route.
Check whether there are foreign objects or missing parts.
OK?
NO
Clean or replace the defective parts.
OK?
YES
END
NO
YES
Check the balance of both separation pressure springs.
OK?
NO
Replace the separation pressure spring.
OK?
YES
END
NO
YES
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS.)
OK?
YES
END
NO
Check the white plate.
OK?
NO
Replace the white plate.
OK?
YES
END
NO
YES
Check the CIS unit.
OK?
NO
Repair or replace the defective parts.
OK?
YES
END
END

CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.5. IMAGE IS DISTORTED (WHEN PRINTING)


Please perform the print test (Refer to 2.5. TEST FUNCTIONS.).
OK?
NO
Go to 2.3.12. THERMAL HEAD SECTION.
YES
Check the feed route.
Check if there are foreign objects or missing parts.
OK?
NO
Clean or repair the defective parts.
OK?
YES
END
NO
YES
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS.)
Check for relapse.
YES
END
NO
Check the white plate.
Confirm the plate is not damaged.
OK?
NO
Replace the white plate.
OK?
YES
END
NO
YES
Check each roller.
Check if the separation, feed and pinch rollers are attached correctly.
OK?
NO
Repair the defective parts.
OK?
YES
END
NO
YES
Check each roller for dirt or scratches.
OK?
NO
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS.)
OK?
YES
END
NO
YES
Go to 2.3.11. READ SECTION.
If image distortion is within -1.5%, this is considered normal.

CROSS REFERENCE:

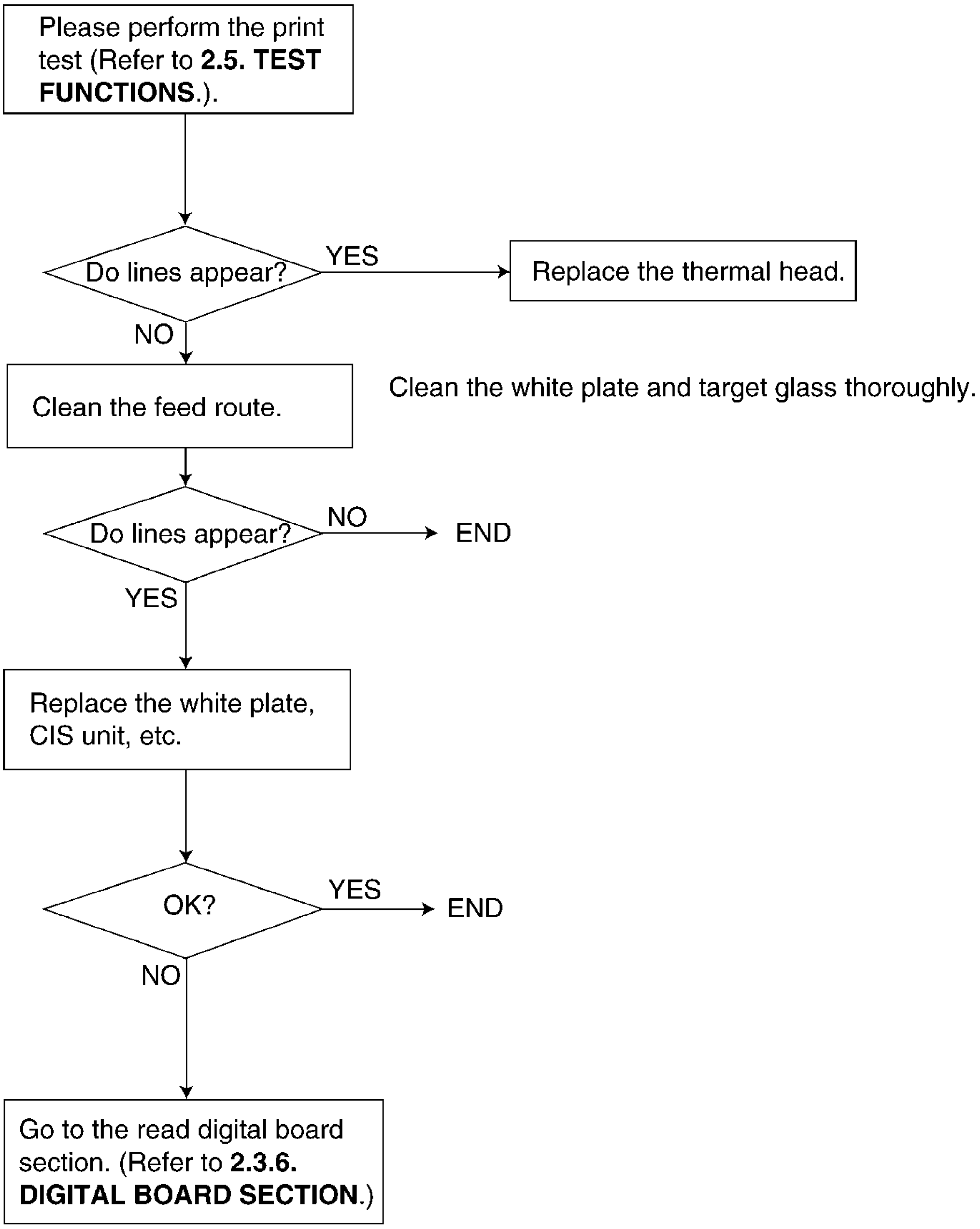
READ SECTION ()

THERMAL HEAD SECTION ()

TEST FUNCTIONS ()

DISASSEMBLY INSTRUCTIONS ()

2.3.4.6. BLACK OR WHITE VERTICAL LINES APPEAR

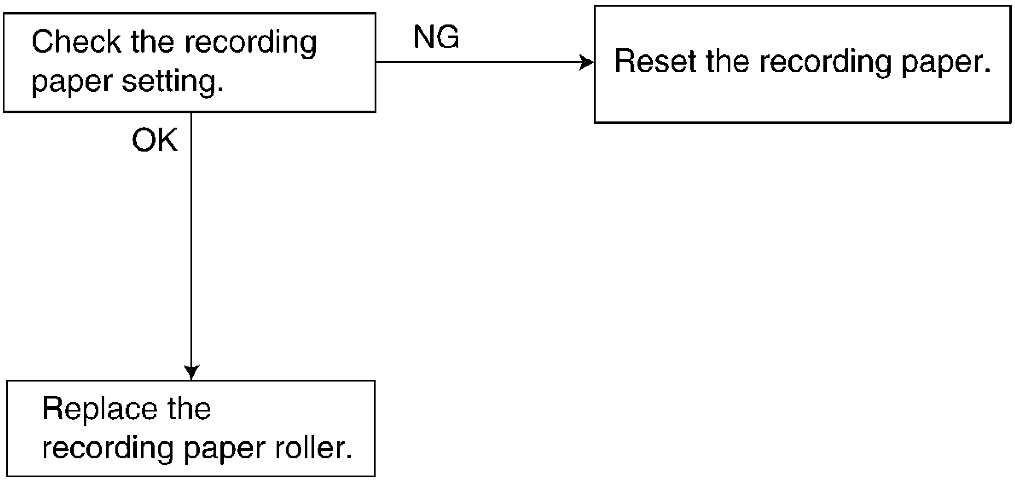

Please perform the print test (Refer to 2.5. TEST FUNCTIONS.).
Do lines appear?
YES
Replace the thermal head.
NO
Clean the feed route.
Clean the white plate and target glass thoroughly.
Do lines appear?
NO
END
YES
Replace the white plate, CIS unit, etc.
OK?
YES
END
NO
Go to the read digital board section. (Refer to 2.3.6. DIGITAL BOARD SECTION.)

CROSS REFERENCE:

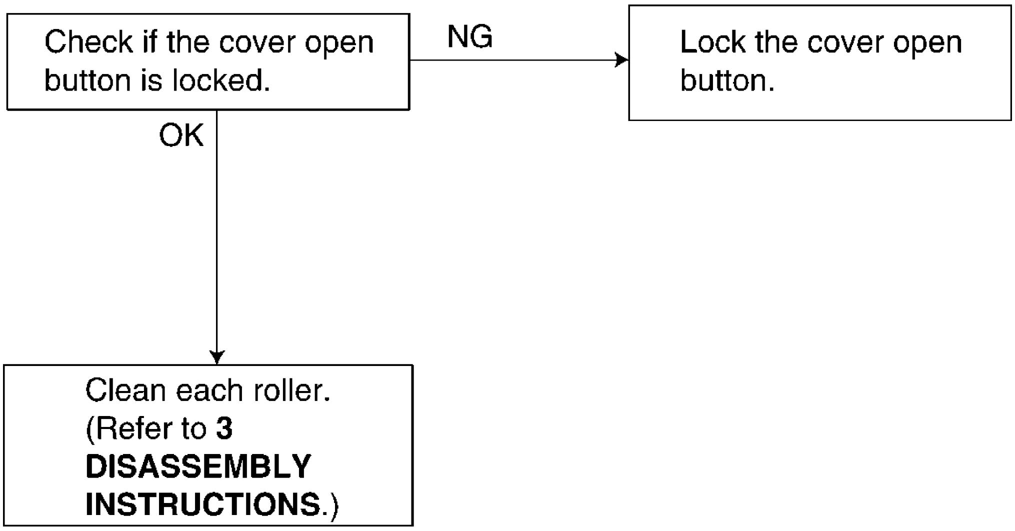
DIGITAL BOARD SECTION ()

TEST FUNCTIONS ()

2.3.4.7. SKEWED RECEIVING IMAGE


Check the recording paper setting.
NG
Reset the recording paper.
OK
Replace the recording paper roller.

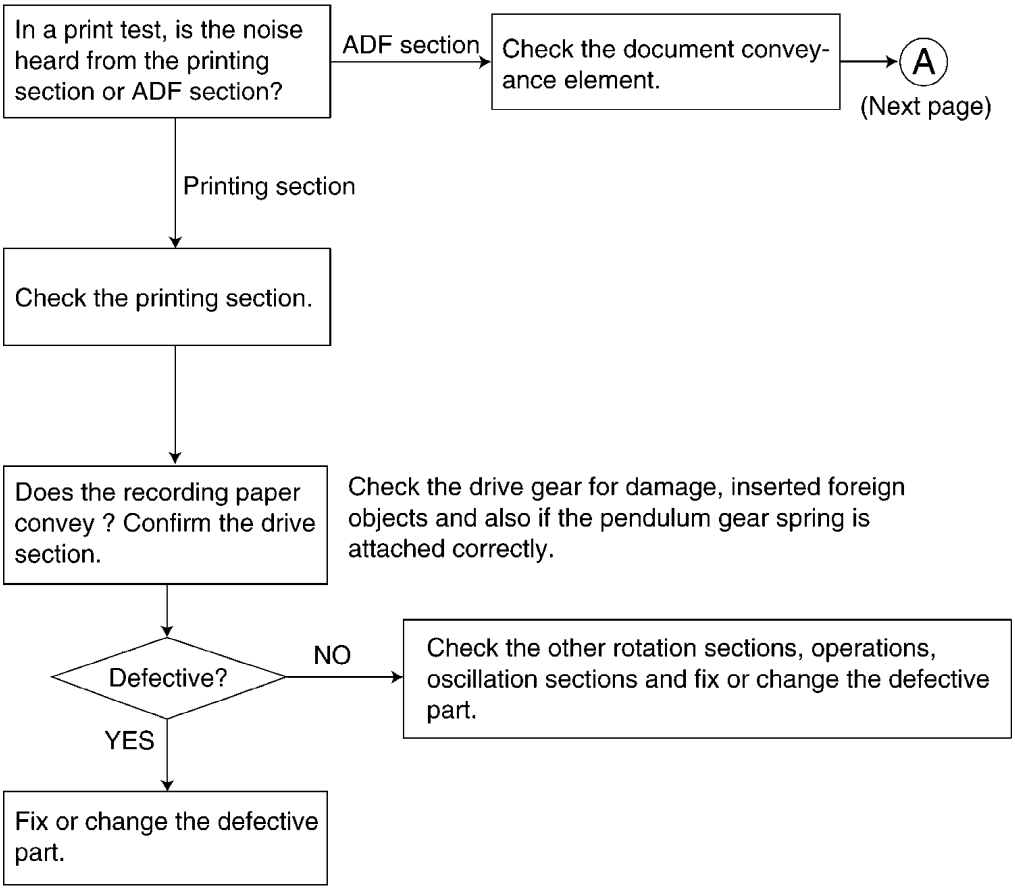
2.3.4.8. EXPANDER PRINT (WHEN PRINTING)

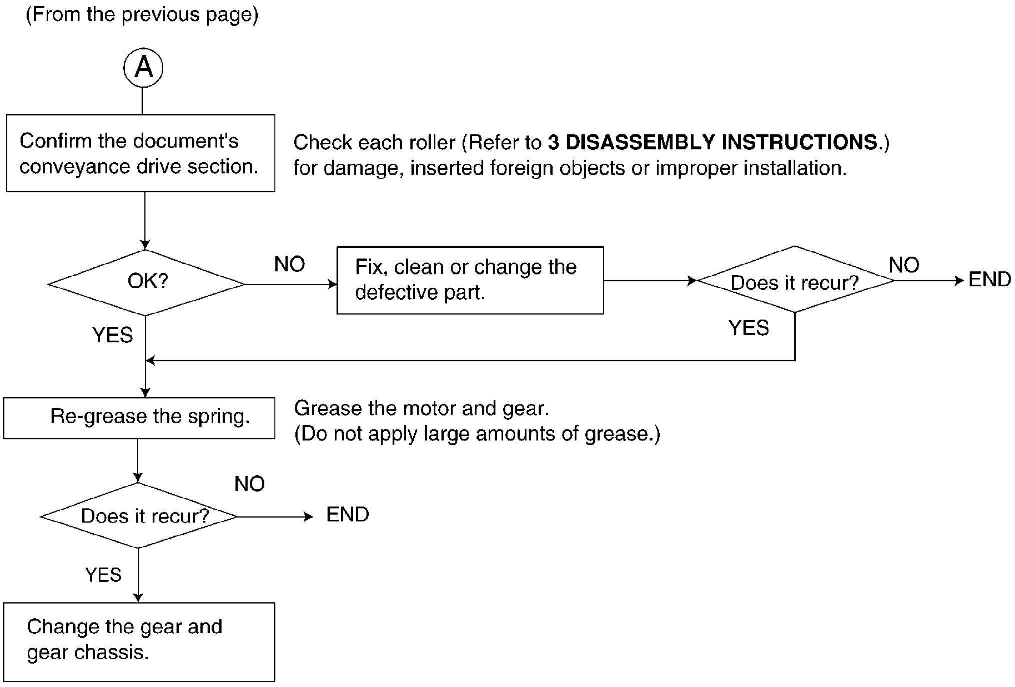

Check if the cover open button is locked.
NG
Lock the cover open button.
OK
Clean each roller. (Refer to 3 DISASSEMBLY INSTRUCTIONS.)

CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.9. WHEN COPYING OR PRINTING, AN ABNORMAL SOUND IS HEARD FROM THE UNIT


In a print test, is the noise heard from the printing section or ADF section?
ADF section
Check the document conveyance element.
A
(Next page)
Printing section
Check the printing section.
Does the recording paper convey ? Confirm the drive section.
Check the drive gear for damage, inserted foreign objects and also if the pendulum gear spring is attached correctly.
Defective?
NO
Check the other rotation sections, operations, oscillation sections and fix or change the defective part.
YES
Fix or change the defective part.


(From the previous page)
A
Confirm the document's conveyance drive section.
Check each roller (Refer to 3 DISASSEMBLY INSTRUCTIONS.) for damage, inserted foreign objects or improper installation.
OK?
NO
Fix, clean or change the defective part.
Does it recur?
NO
END
YES
YES
Re-grease the spring.
Grease the motor and gear. (Do not apply large amounts of grease.)
Does it recur?
NO
END
YES
Change the gear and gear chassis.

CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

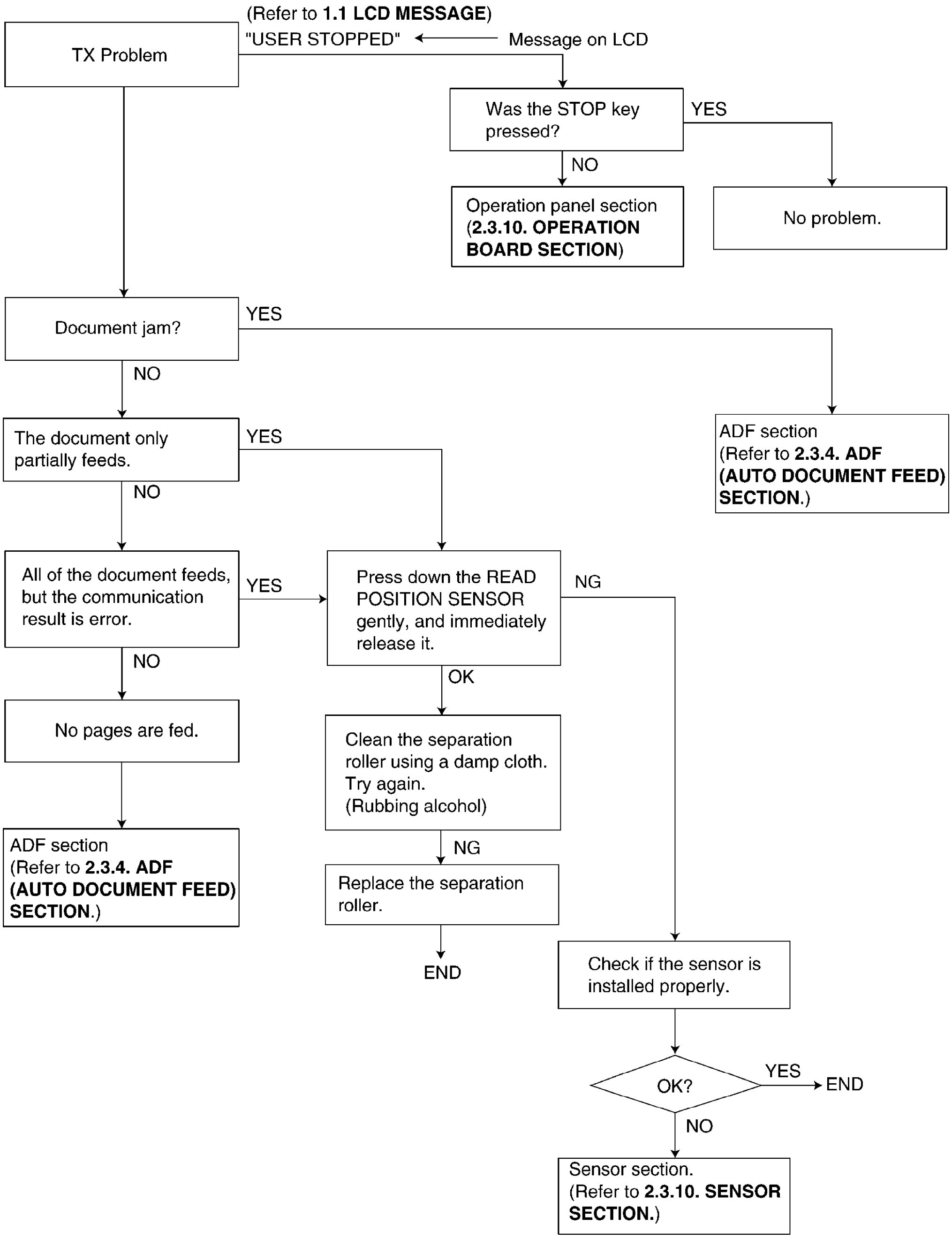
2.3.5. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in DEFECTIVE FACSIMILE SECTION ().

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (Copying is possible.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax receives successfully one time and fails another. (Copying is possible.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.5.1. DEFECTIVE FACSIMILE SECTION

2.3.5.1.1. TRANSMIT PROBLEM


(Refer to **1.1 LCD MESSAGE**)
"USER STOPPED"
Message on LCD
TX Problem
Was the STOP key pressed?
YES
NO
Operation panel section (**2.3.10. OPERATION BOARD SECTION**)
No problem.
Document jam?
YES
NO
ADF section (Refer to **2.3.4. ADF (AUTO DOCUMENT FEED) SECTION**.)
The document only partially feeds.
YES
NO
All of the document feeds, but the communication result is error.
YES
Press down the READ POSITION SENSOR gently, and immediately release it.
NG
OK
NO
No pages are fed.
Clean the separation roller using a damp cloth. Try again. (Rubbing alcohol)
NG
Replace the separation roller.
END
ADF section (Refer to **2.3.4. ADF (AUTO DOCUMENT FEED) SECTION**.)
Check if the sensor is installed properly.
OK?
YES
END
NO
Sensor section. (Refer to **2.3.10. SENSOR SECTION.**)

CROSS REFERENCE:

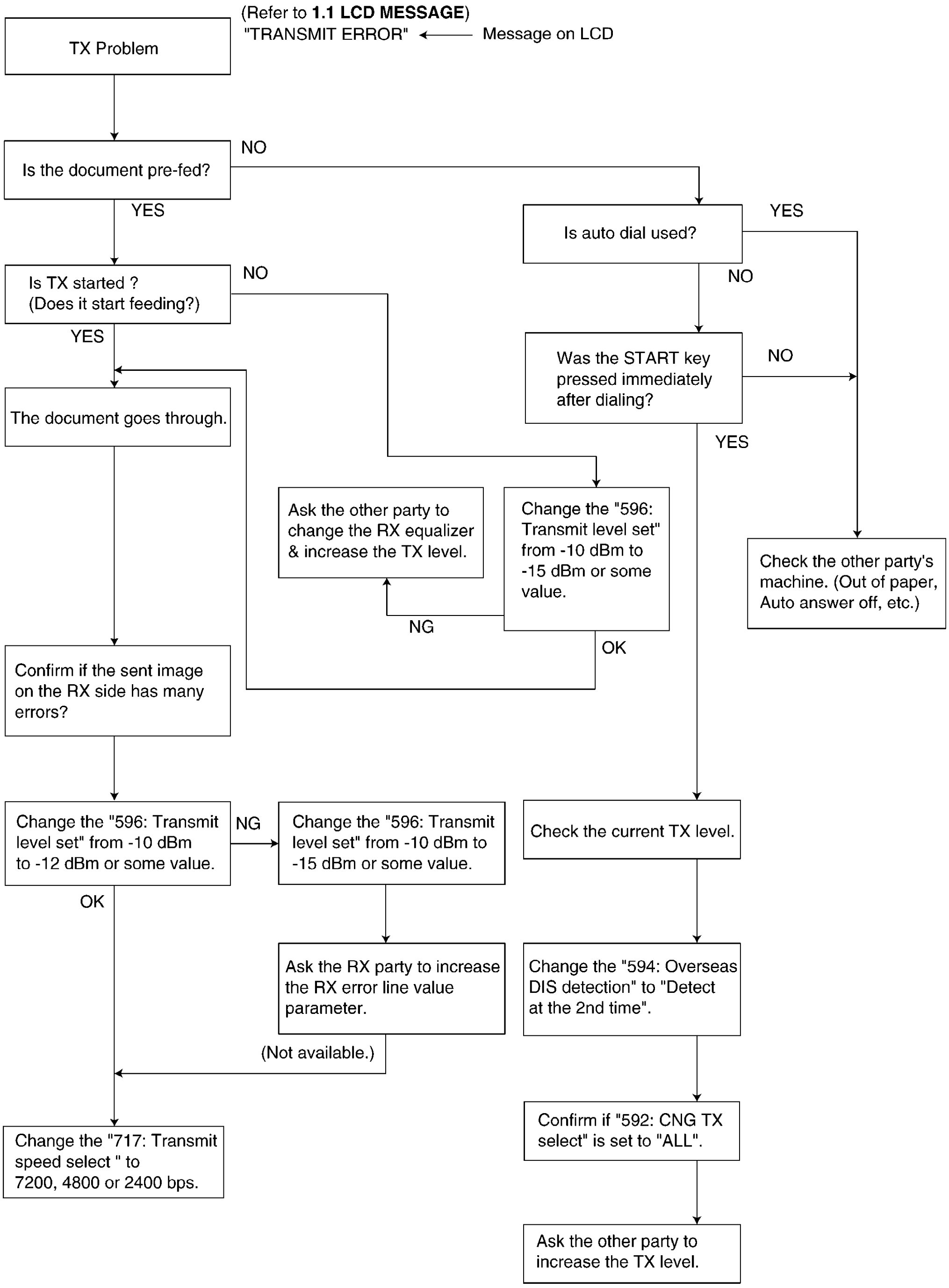
LCD MESSAGE ()

ADF (AUTO DOCUMENT FEED) SECTION ()

OPERATION BOARD SECTION ()

SENSOR SECTION ()

2.3.5.1.2. SOMETIMES THERE IS A TRANSMIT PROBLEM


(Refer to 1.1 LCD MESSAGE)
"TRANSMIT ERROR"
Message on LCD
TX Problem
Is the document pre-fed?
NO
YES
Is auto dial used?
YES
NO
Is TX started ?
(Does it start feeding?)
NO
YES
Was the START key pressed immediately after dialing?
NO
YES
The document goes through.
Ask the other party to change the RX equalizer & increase the TX level.
Change the "596: Transmit level set" from -10 dBm to -15 dBm or some value.
NG
OK
Check the other party's machine. (Out of paper, Auto answer off, etc.)
Confirm if the sent image on the RX side has many errors?
Change the "596: Transmit level set" from -10 dBm to -12 dBm or some value.
NG
OK
Change the "596: Transmit level set" from -10 dBm to -15 dBm or some value.
Check the current TX level.
Ask the RX party to increase the RX error line value parameter.
(Not available.)
Change the "594: Overseas DIS detection" to "Detect at the 2nd time".
Change the "717: Transmit speed select " to 7200, 4800 or 2400 bps.
Confirm if "592: CNG TX select" is set to "ALL".
Ask the other party to increase the TX level.

CROSS REFERENCE:

LCD MESSAGE ()

2.3.5.1.3. RECEPTION PROBLEM

Confirm the following before starting troubleshooting. / Is the recording paper installed properly?

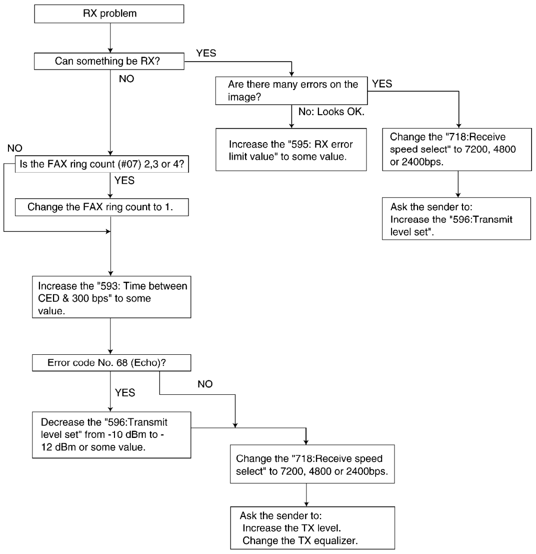
There is the receiving problem when sometimes the below errors may be occurred.

(Refer to LCD MESSAGE ())

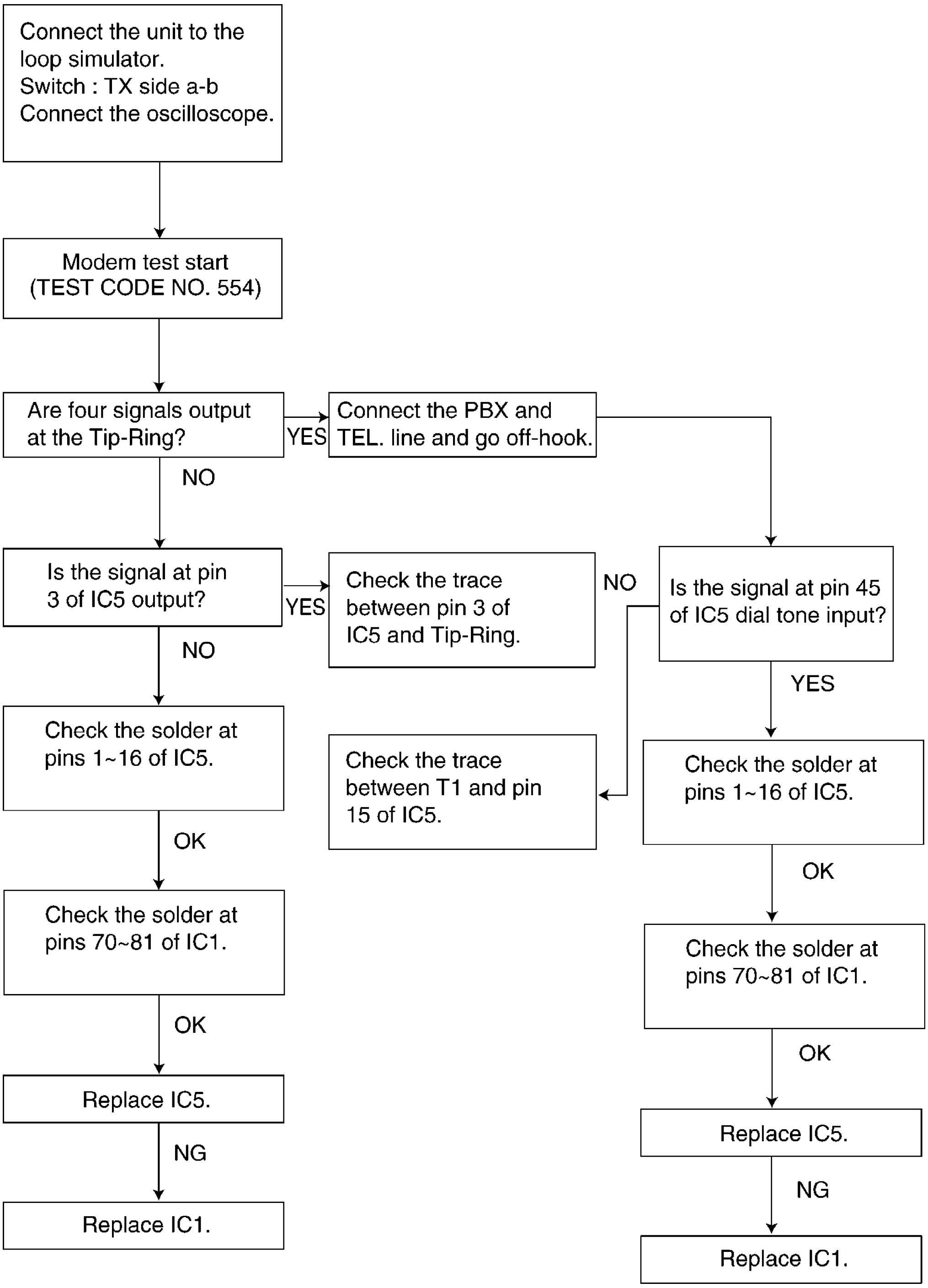
OUT OF PAPER / CHECK COVER / UNIT OVERHEATER(If it doesn't return automatically, COVER

OPEN, etc., reset the unit.) / CHECK DOCUMENT

Please refer to USER RECOVERABLE ERRORS () for the above items. / Also, when a hardware deformity occurs, please check each sensor.


RX problem
Can something be RX?
YES
NO
Are there many errors on the image?
YES
No: Looks OK.
Increase the "595: RX error limit value" to some value.
Change the "718:Receive speed select" to 7200, 4800 or 2400bps.
Ask the sender to: Increase the "596:Transmit level set".
NO
Is the FAX ring count (#07) 2,3 or 4?
YES
Change the FAX ring count to 1.
Increase the "593: Time between CED & 300 bps" to some value.
Error code No. 68 (Echo)?
NO
YES
Decrease the "596:Transmit level set" from -10 dBm to -12 dBm or some value.
Change the "718:Receive speed select" to 7200, 4800 or 2400bps.
Ask the sender to: Increase the TX level. Change the TX equalizer.

2.3.5.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE

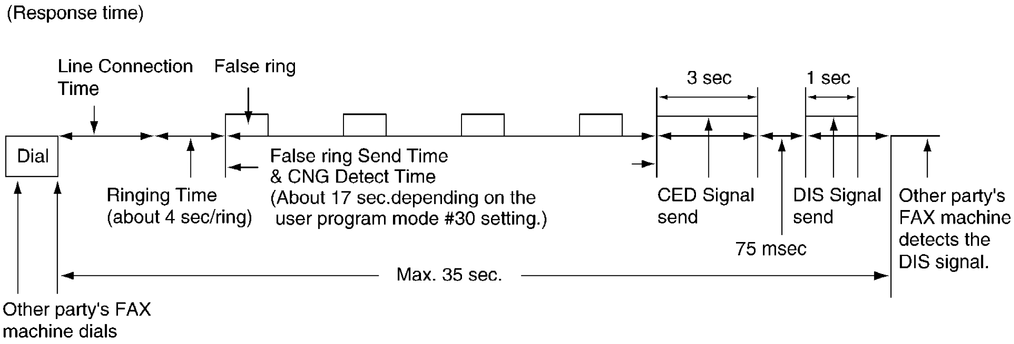

Connect the unit to the loop simulator.
Switch : TX side a-b
Connect the oscilloscope.
Modem test start (TEST CODE NO. 554)
Are four signals output at the Tip-Ring?
YES
Connect the PBX and TEL. line and go off-hook.
NO
Is the signal at pin 3 of IC5 output?
YES
Check the trace between pin 3 of IC5 and Tip-Ring.
NO
Is the signal at pin 45 of IC5 dial tone input?
NO
Check the solder at pins 1~16 of IC5.
Check the trace between T1 and pin 15 of IC5.
YES
Check the solder at pins 1~16 of IC5.
OK
Check the solder at pins 70~81 of IC1.
OK
Check the solder at pins 70~81 of IC1.
OK
Replace IC5.
NG
Replace IC1.
OK
Replace IC5.
NG
Replace IC1.

2.3.5.1.5. UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS

The following 2 causes can be considered for this.

Cause 1:
The other party is executing automatic dialling, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to the CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the

other party releases the line.)

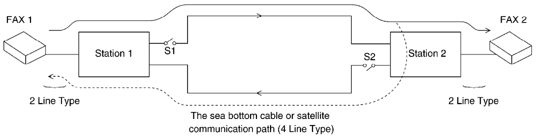

(Response time)
Line Connection Time
False ring
3 sec
1 sec
Dial
Ringing Time (about 4 sec/ring)
False ring Send Time & CNG Detect Time (About 17 sec.depending on the user program mode #30 setting.)
CED Signal send
DIS Signal send
75 msec
Other party's FAX machine detects the DIS signal.
Max. 35 sec.
Other party's FAX machine dials

(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced. Long distance connection and linking of several stations means the line connection time cannot be reduced. Accordingly, the following countermeasures should be attempted. / (A) The TEL/FAX DELAYED RING count should be 1. (User parameter: code No. 78) / (B) As the 35 sec. count starts directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. / Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time will be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection due to an echo or echo canceler.


FAX 1
FAX 2
Station 1
Station 2
S1
S2
2 Line Type
2 Line Type
The sea bottom cable or satellite communication path (4 Line Type)

(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via the stations 1 and 2, but the reflection signal at station 2 also returns via station 1(echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 a max. of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1, station 2) attaches echo cancellers (S1, S2) for international lines or long distance lines. For the echo canceller, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service co (Internatio sele This counte becomes t valu
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service co (CED fre sele
	Receiving side		Change the regular rime of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service co (Time betw and 30
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service co (Overse detection
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler. or	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service co (Transmit
4	Sending side Receiving side		Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not received.	Service co (Receiving
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both end.	Service co (T4 ti

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

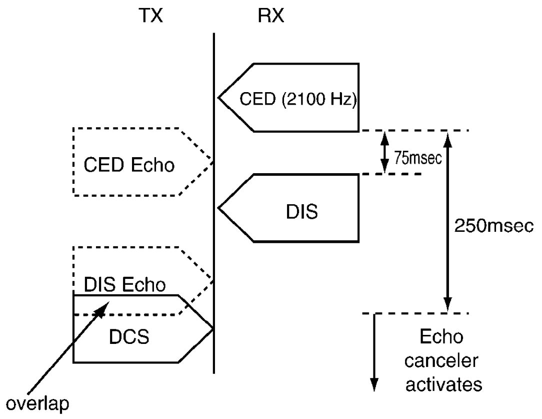

TX
RX
CED (2100 Hz)
CED Echo
75msec
DIS
250msec
DIS Echo
DCS
overlap
Echo
canceler
activates

Fig. b (Countermeasure by Changing the CED Frequency)

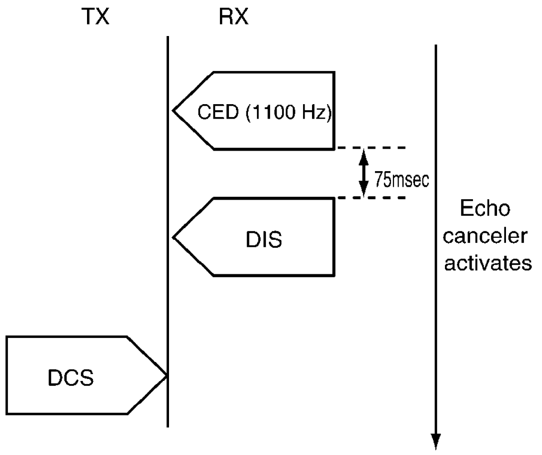

TX
RX
CED (1100 Hz)
75msec
DIS
Echo
canceler
activates
DCS

Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

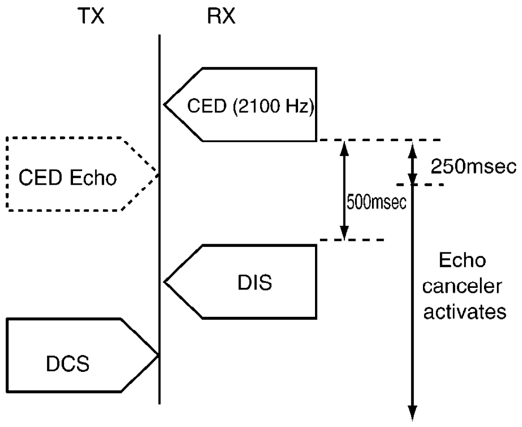
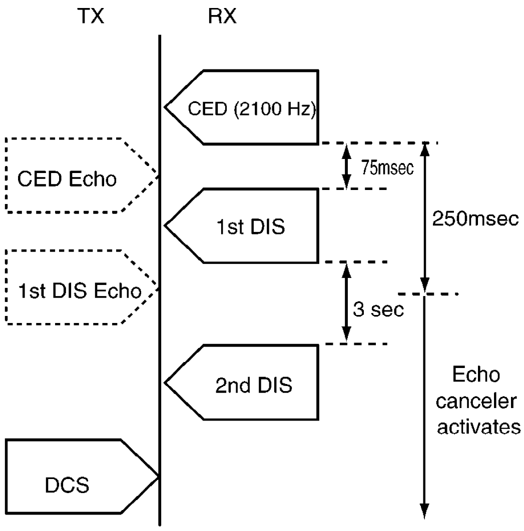
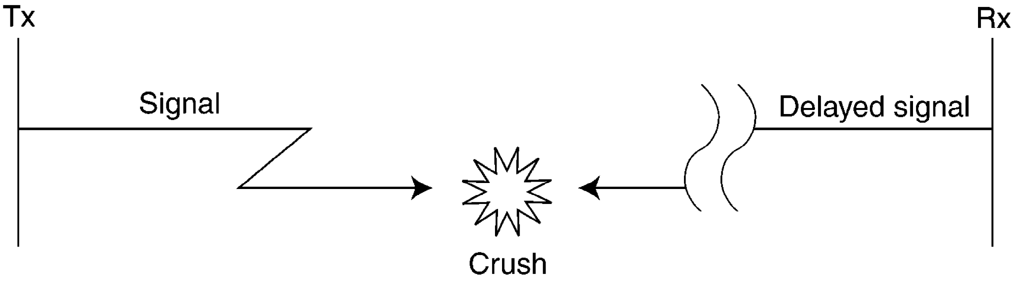

TX
RX
CED (2100 Hz)
CED Echo
250msec
500msec
DIS
Echo
canceler
activates
DCS

Fig. d (C3ountemeasure by Ignoring the 1st DIS)


TX
RX
CED (2100 Hz)
CED Echo
1st DIS
1st DIS Echo
2nd DIS
DCS
75msec
250msec
3 sec
Echo canceler activates

<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)


Tx
Rx
Signal
Delayed signal
Crush

2.3.5.1.6. THE UNIT CAN COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT

(Long distance or international communication operation)
This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.
The countermeasures for this unit are shown below.

Transmission Operation:
Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:
If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

- Refer to SERVICE FUNCTION TABLE().

2.3.5.1.7. HOW TO RECORD FAX SIGNAL BY USING PC

Recording FAX signal is one of the useful analysis measures to solve communication problems. The way of recording easily by using PC is shown as follows.

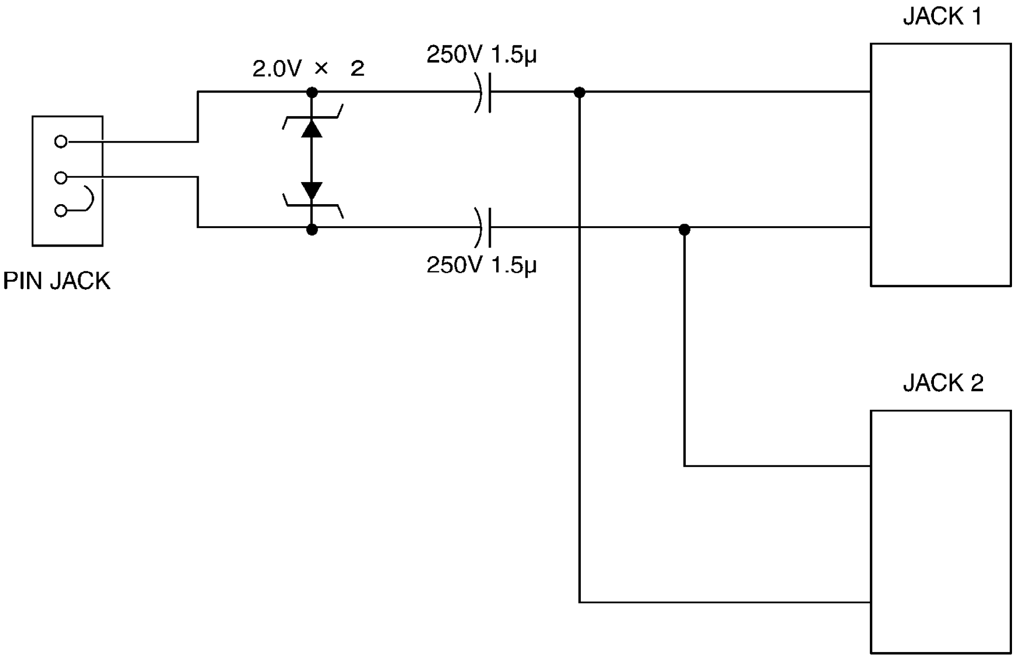
1. Equipment

- 1 jig
- 1 PC (with LINE IN)
- 1 audio cord (mini jack supported)
- 2 tel cords

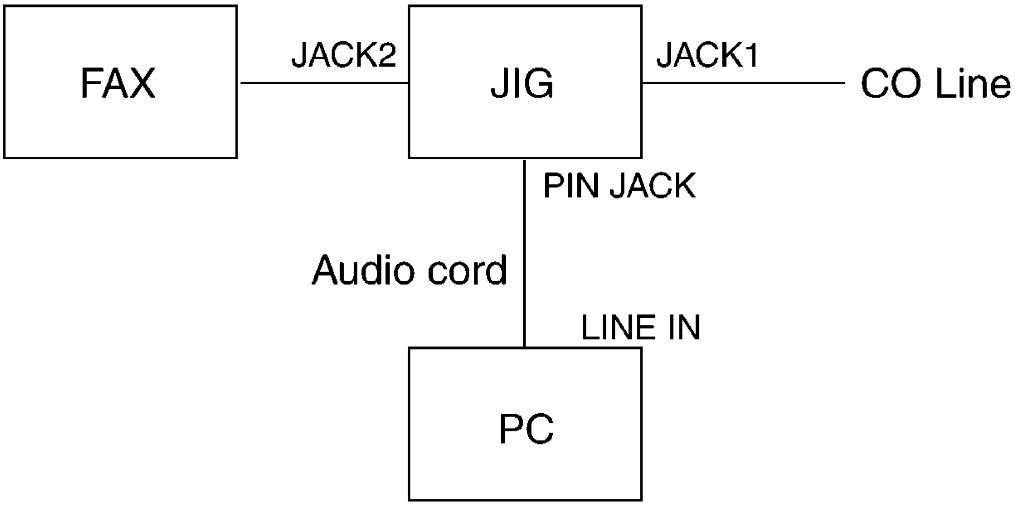
Parts No.	Parts Name & Description	Qt'y
PQJJ1T004Z	JACK1, JACK2	2
PQJJ1D010Z	PIN JACK	1
ECQE2155KF or ECQE2E155KC	CAPACITOR	2
MA4020	DIODE	2

2. Setting up

FAX SIGNAL RECORDING JIG



3. Connecting PC and JIG



4. PC setting and recording

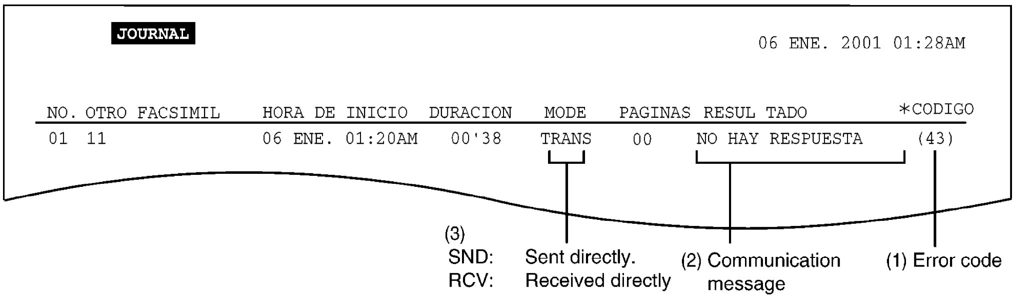
1. **Set LINE IN to be valid in the volume control setting. Refer to the PC instruction book.**
2. **Start up the PC software “ SOUND RECORDER”. (This software is bundled to Windows OS, which can create WAV file.) Set the audio format “ PCM 22.050kHz, 8bit, mono”.**
3. **Click the record button and start recording after acquisition the signal.**

Note:

- **Not to be wind wave patterns on the wave monitor.**
- **Please compress the recording data when you send attaching to E-Mail because the data size will be so heavy.**
- **Any software which can create WAV files is available.**

2.3.5.1.8. HOW TO OUTPUT THE JOURNAL REPORT

1. **Press three times.**
2. **Press SET .**
3. **Press ◄ or ► until the “ JOURNAL REPORT ” is displayed.**
4. **The report is printed out.**



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JOURNAL
                                                        06 ENE. 2001 01:28AM

NO. OTRO FACSIMIL     HORA DE INICIO  DURACION   MODE    PAGINAS  RESUL TADO          *CODIGO
01  11                06 ENE. 01:20AM   00'38    TRANS     00     NO HAY RESPUESTA      (43)
```

(3)
SND: Sent directly.
RCV: Received directly
(2) Communication message
(1) Error code

Error code table:

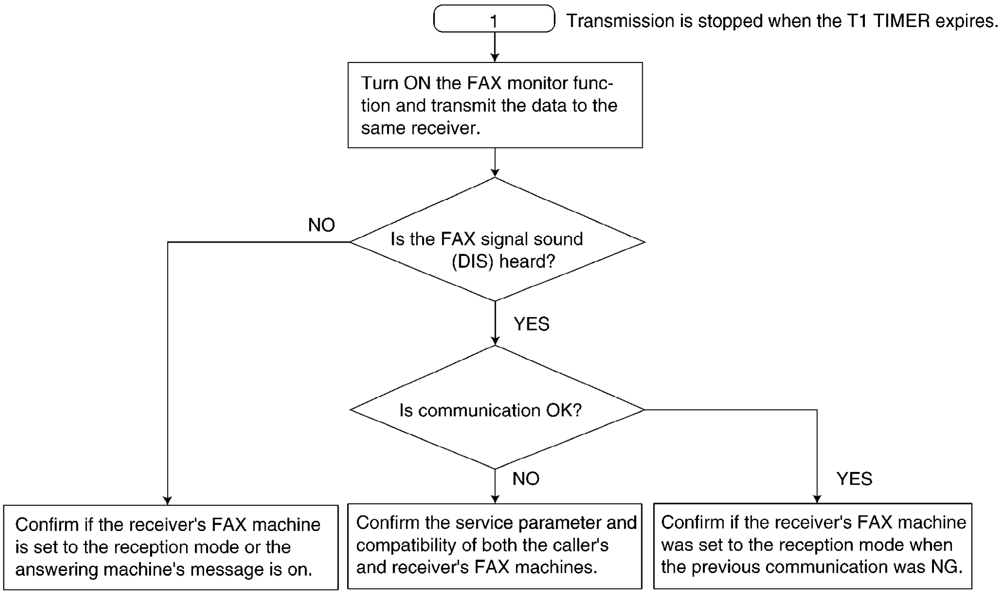
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	PRINTER OVERHEATED	RCV	The thermal head is overheated.	
	PAPER OUT	RCV	Out of thermal paper or the cover is open.	
40	OTHER FAX NOT RESPOND	SND	Transmission is stopped when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	SND	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	SND	No post message.	
49	COMMUNICATION ERROR	SND	RTN is transmitted.	
50	COMMUNICATION ERROR	SND	PIN is transmitted (to PRI-Q).	
51	COMMUNICATION ERROR	SND	PIN is transmitted.	
52	OTHER FAX NOT RESPOND	SND	Reception is finished when the T1 TIMER expires.	
53	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC and DTC.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC .	
57	COMMUNICATION ERROR	SND	300bps error	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	

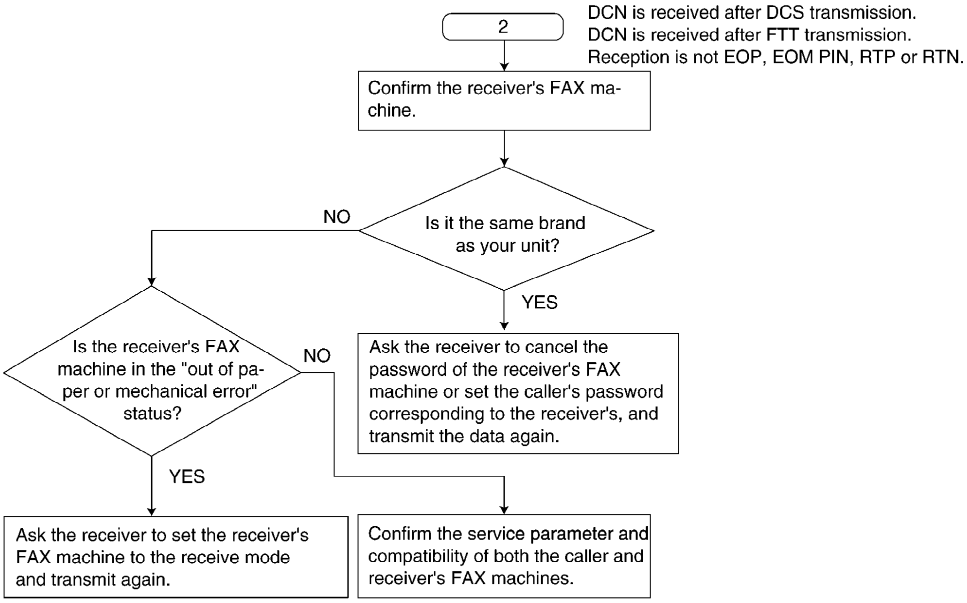
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
59	ERROR-NOT YOUR UNIT	SND	DCN responds to a post message.	
64	COMMUNICATION ERROR	SND	Polling is not possible.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	The carrier is cut when the image signal is received.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error.	

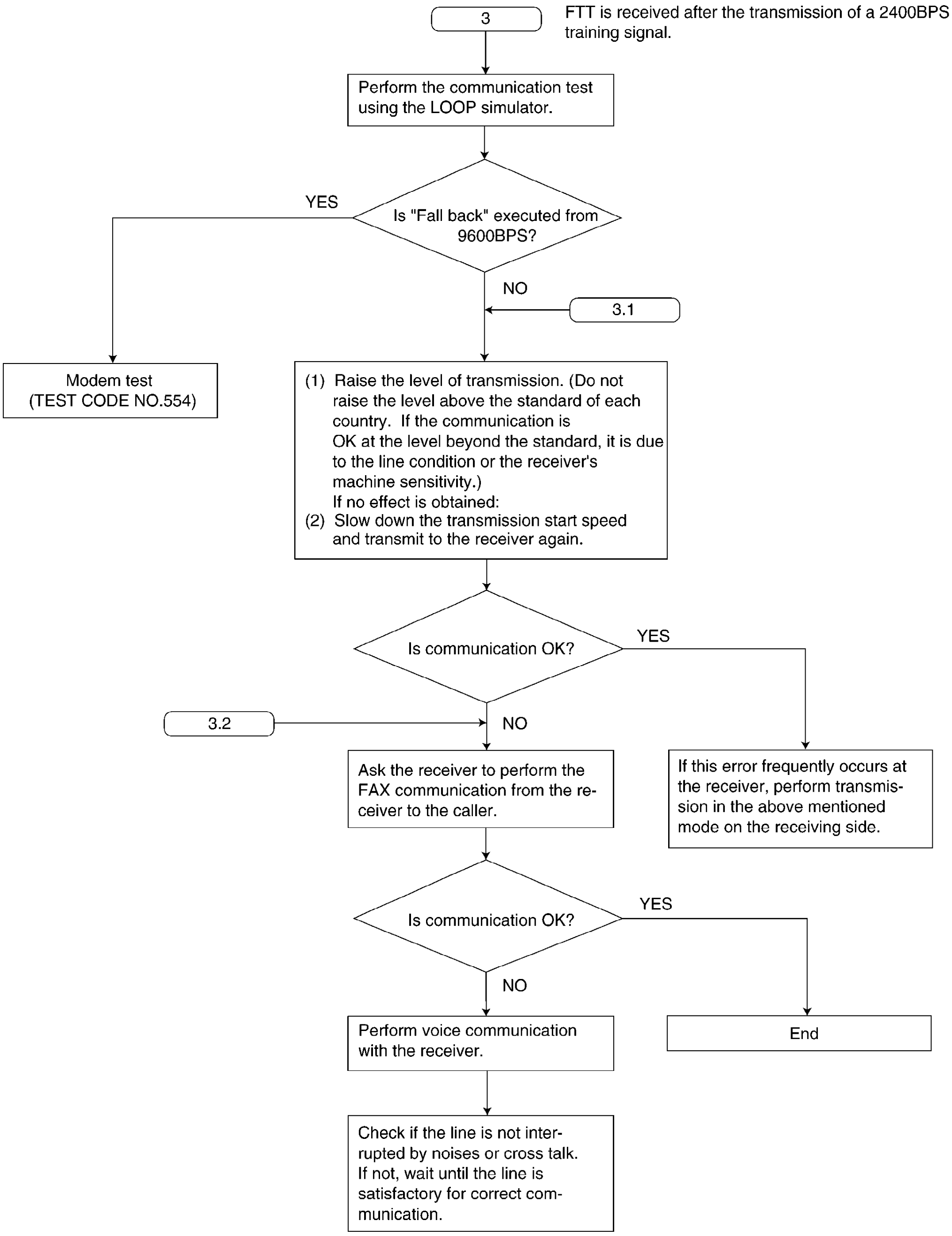
SND=TRANSMISSION RCV=RECEPTION
Most fax communication problems can be resolved by the following steps.

1. **Change the transmit level. (Service code: 596, refer to SERVICE FUNCTION TABLE().)**
2. **Change the TX speed/RX speed. (Service code: 717/718, refer to SERVICE FUNCTION TABLE ().)**

Note*:
If the problem remains, see the following "Countermeasure" flow chart.


1
Transmission is stopped when the T1 TIMER expires.
Turn ON the FAX monitor function and transmit the data to the same receiver.
Is the FAX signal sound (DIS) heard?
NO
YES
Is communication OK?
NO
YES
Confirm if the receiver's FAX machine is set to the reception mode or the answering machine's message is on.
Confirm the service parameter and compatibility of both the caller's and receiver's FAX machines.
Confirm if the receiver's FAX machine was set to the reception mode when the previous communication was NG.

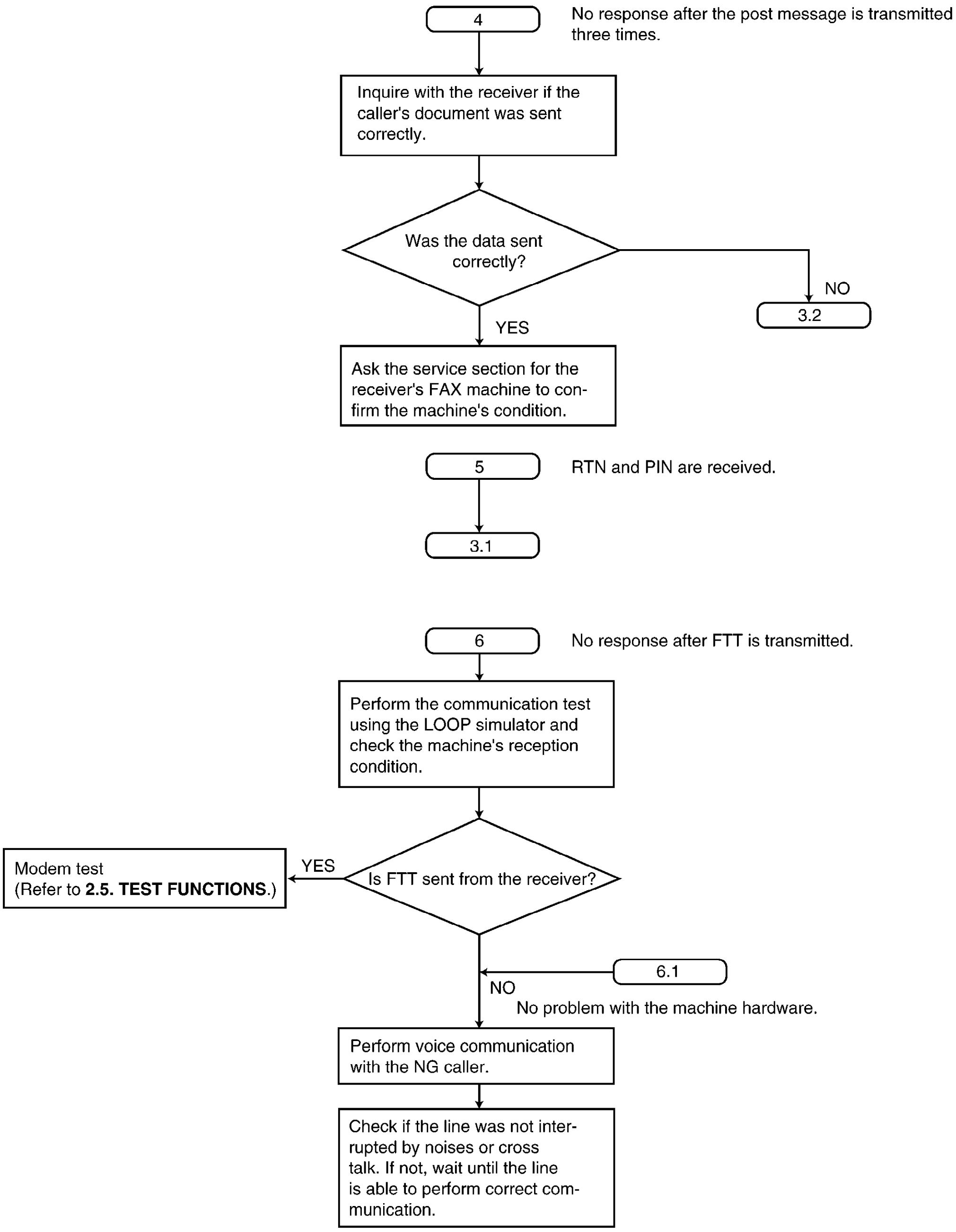

2
DCN is received after DCS transmission.
DCN is received after FTT transmission.
Reception is not EOP, EOM PIN, RTP or RTN.
Confirm the receiver's FAX machine.
Is it the same brand as your unit?
NO
YES
Is the receiver's FAX machine in the "out of paper or mechanical error" status?
NO
YES
Ask the receiver to cancel the password of the receiver's FAX machine or set the caller's password corresponding to the receiver's, and transmit the data again.
Ask the receiver to set the receiver's FAX machine to the receive mode and transmit again.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.



3
FTT is received after the transmission of a 2400BPS training signal.
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 9600BPS?
YES
NO
3.1
Modem test
(TEST CODE NO.554)
(1) Raise the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
If no effect is obtained:
(2) Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
NO
3.2
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line is not interrupted by noises or cross talk. If not, wait until the line is satisfactory for correct communication.

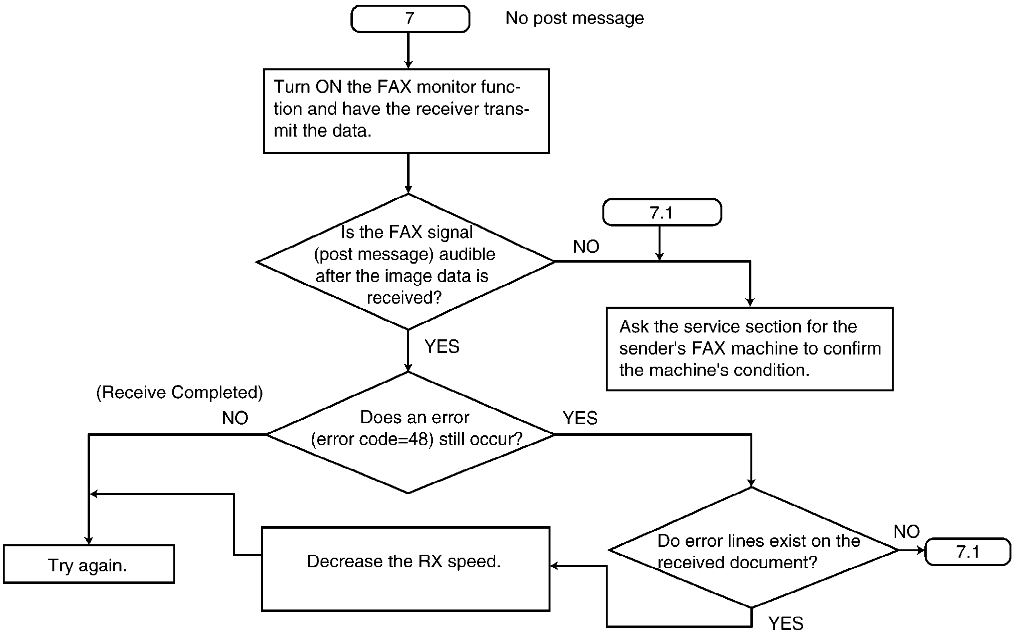
CROSS REFERENCE:

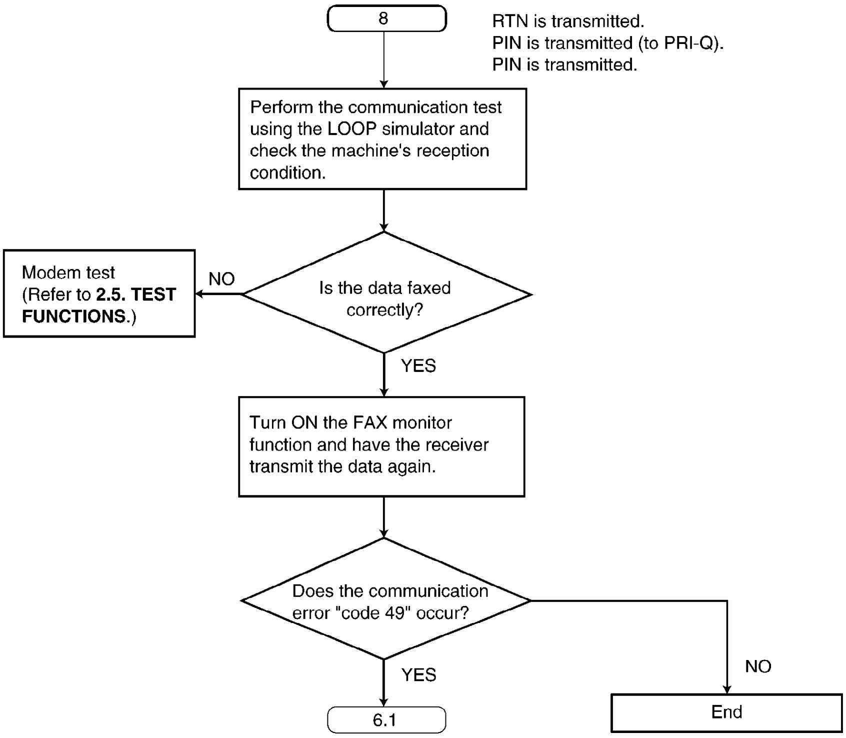
TEST FUNCTIONS()


4
No response after the post message is transmitted three times.
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.
5
RTN and PIN are received.
3.1
6
No response after FTT is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test
(Refer to 2.5. TEST FUNCTIONS.)
YES
Is FTT sent from the receiver?
6.1
NO
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

CROSS REFERENCE:

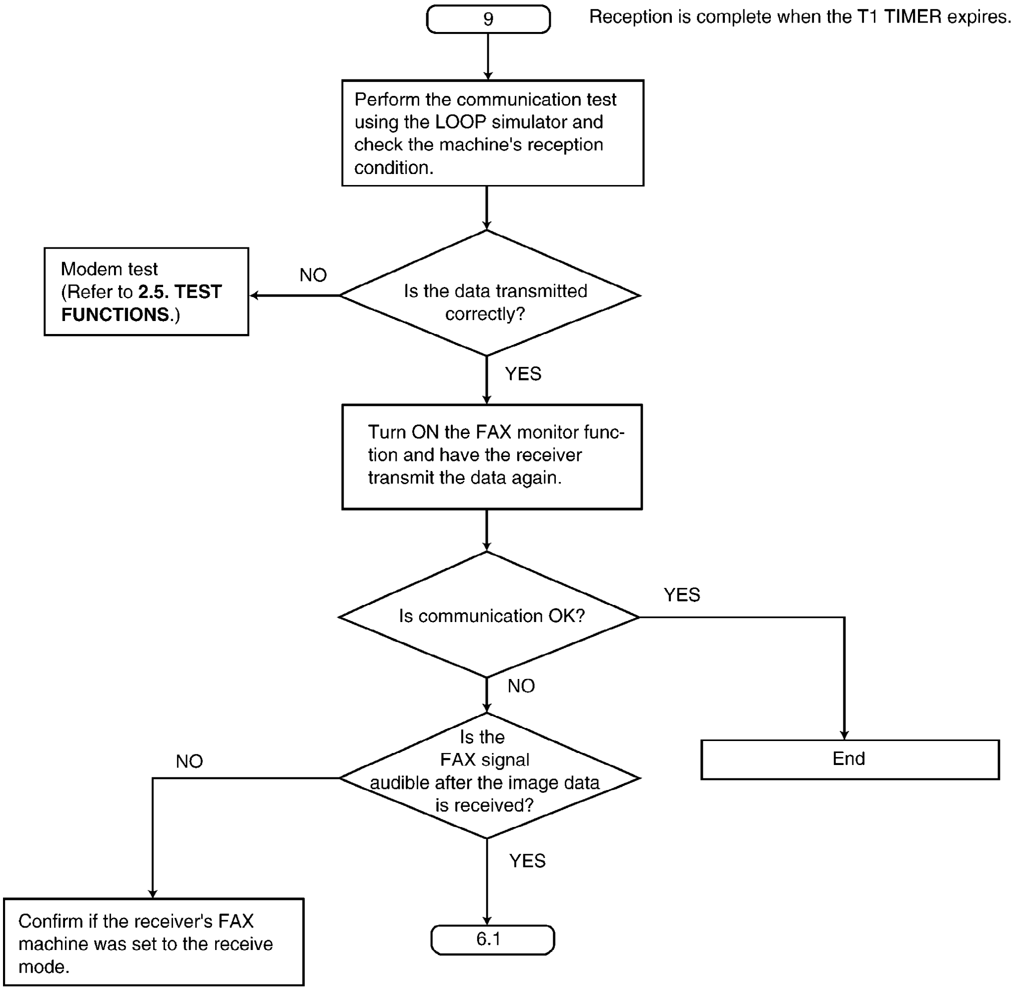
TEST FUNCTIONS()


7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) audible after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Try again.
Decrease the RX speed.
Do error lines exist on the received document?
NO
7.1
YES


8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test (Refer to 2.5. TEST FUNCTIONS.)
NO
Is the data faxed correctly?
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
6.1
NO
End

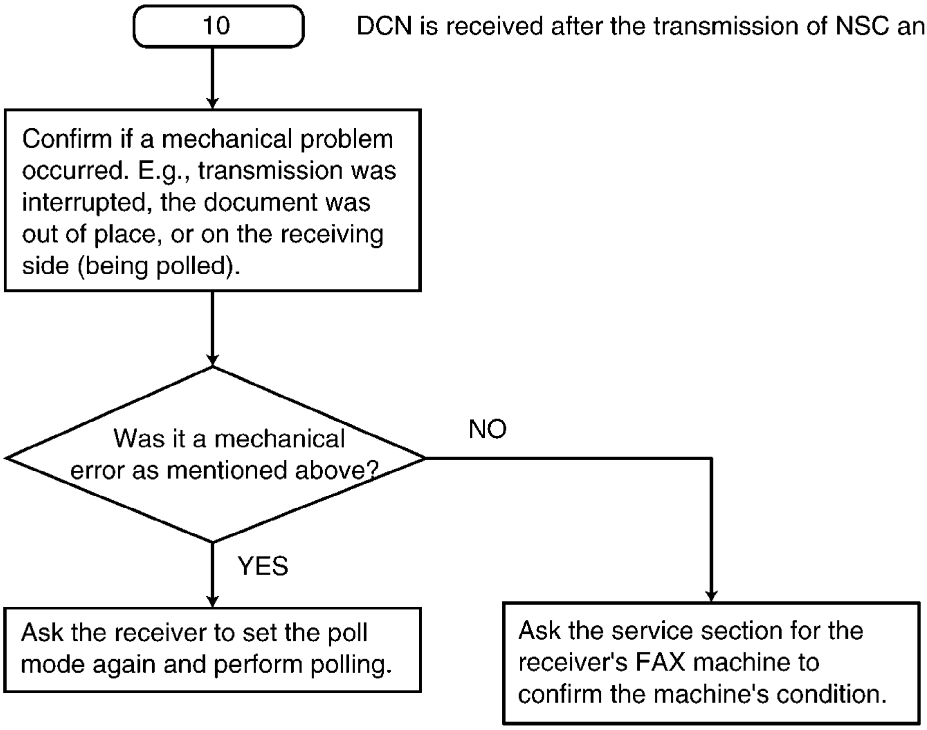
CROSS REFERENCE:

TEST FUNCTIONS()


9
Reception is complete when the T1 TIMER expires.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to 2.5. TEST FUNCTIONS.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal audible after the image data is received?
NO
Confirm if the receiver's FAX machine was set to the receive mode.
YES
6.1

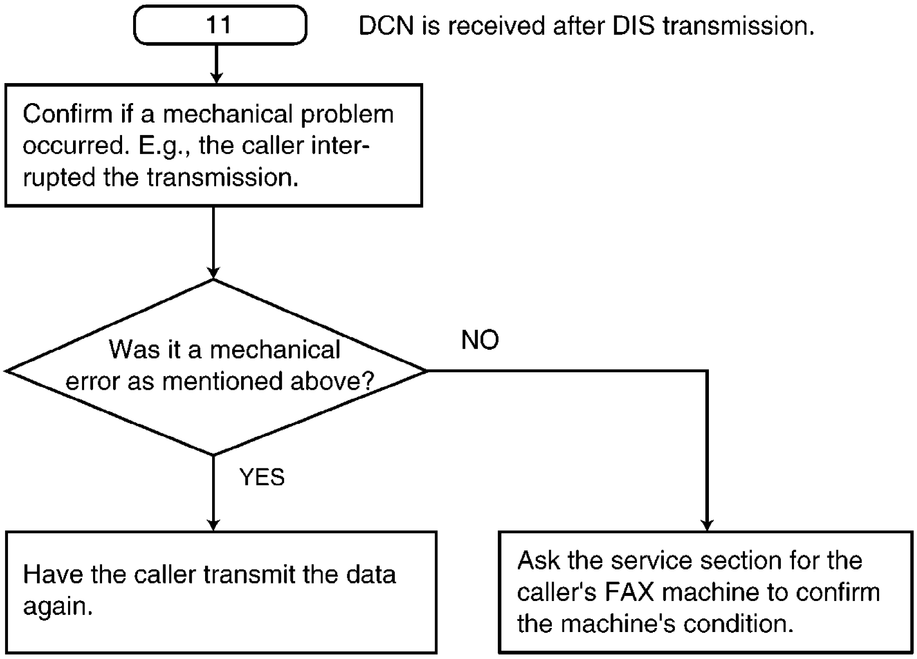
CROSS REFERENCE:

TEST FUNCTIONS()



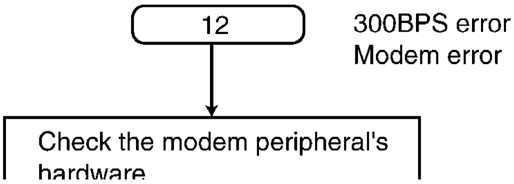
DCN is received after the transmission of NSC and DTC.

10
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.



DCN is received after DIS transmission.

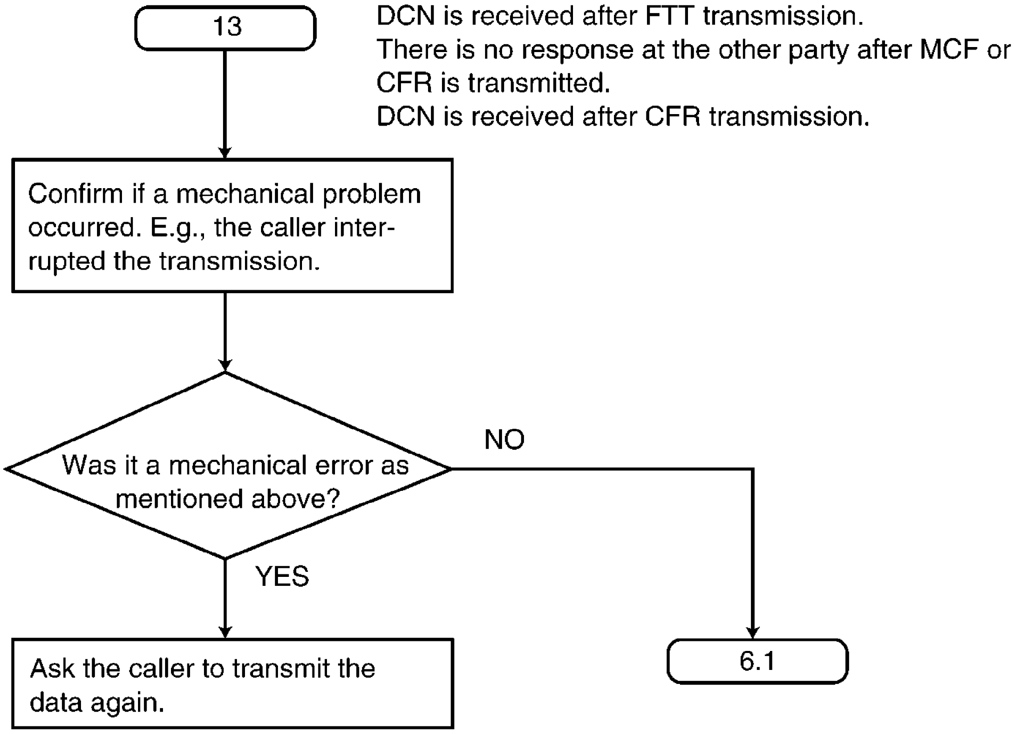
11
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.



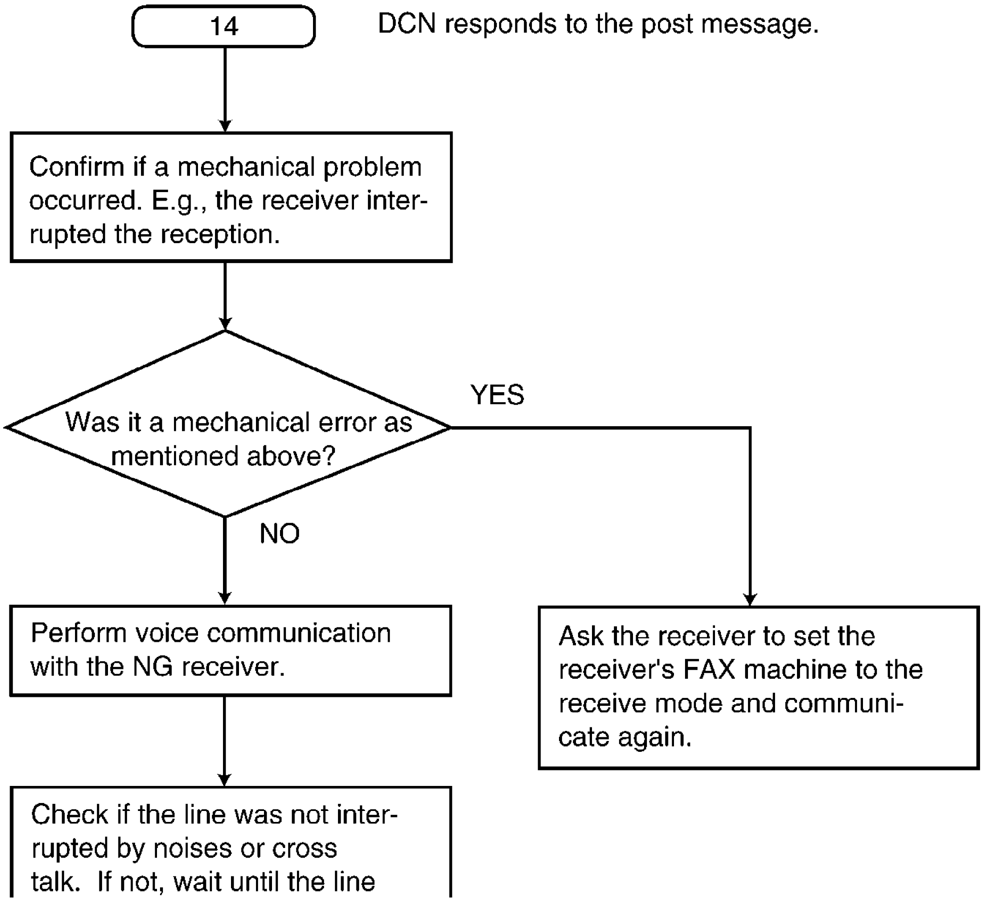
300BPS error
Modem error

12
Check the modem peripheral's hardware

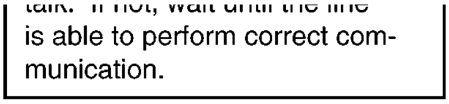
hardware.

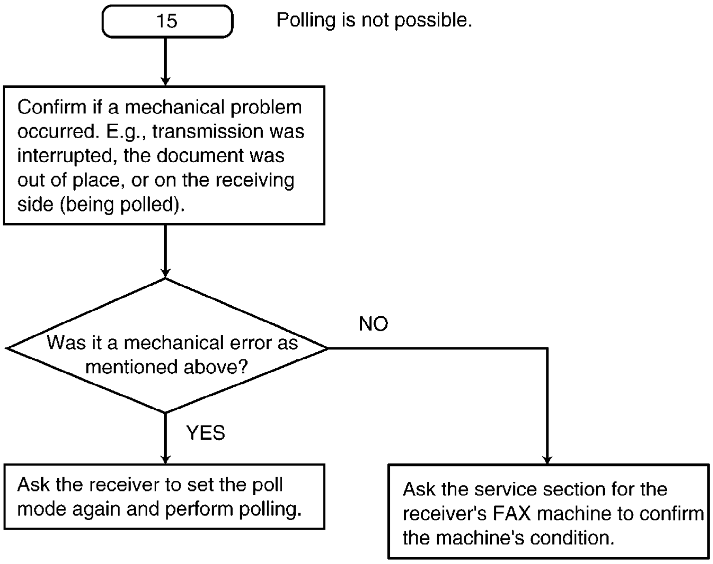

DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.

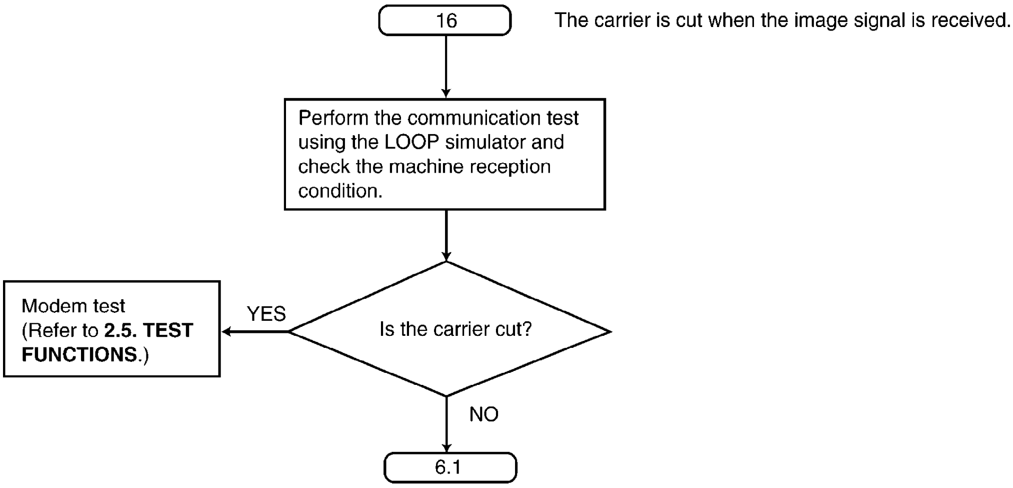
13
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1


DCN responds to the post message.

14
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line


is able to perform correct communication.


15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Is the carrier cut?
YES
Modem test (Refer to 2.5. TEST FUNCTIONS.)
NO
6.1

CROSS REFERENCE:
TEST FUNCTIONS()

2.3.5.2. REMOTE PROGRAMMING

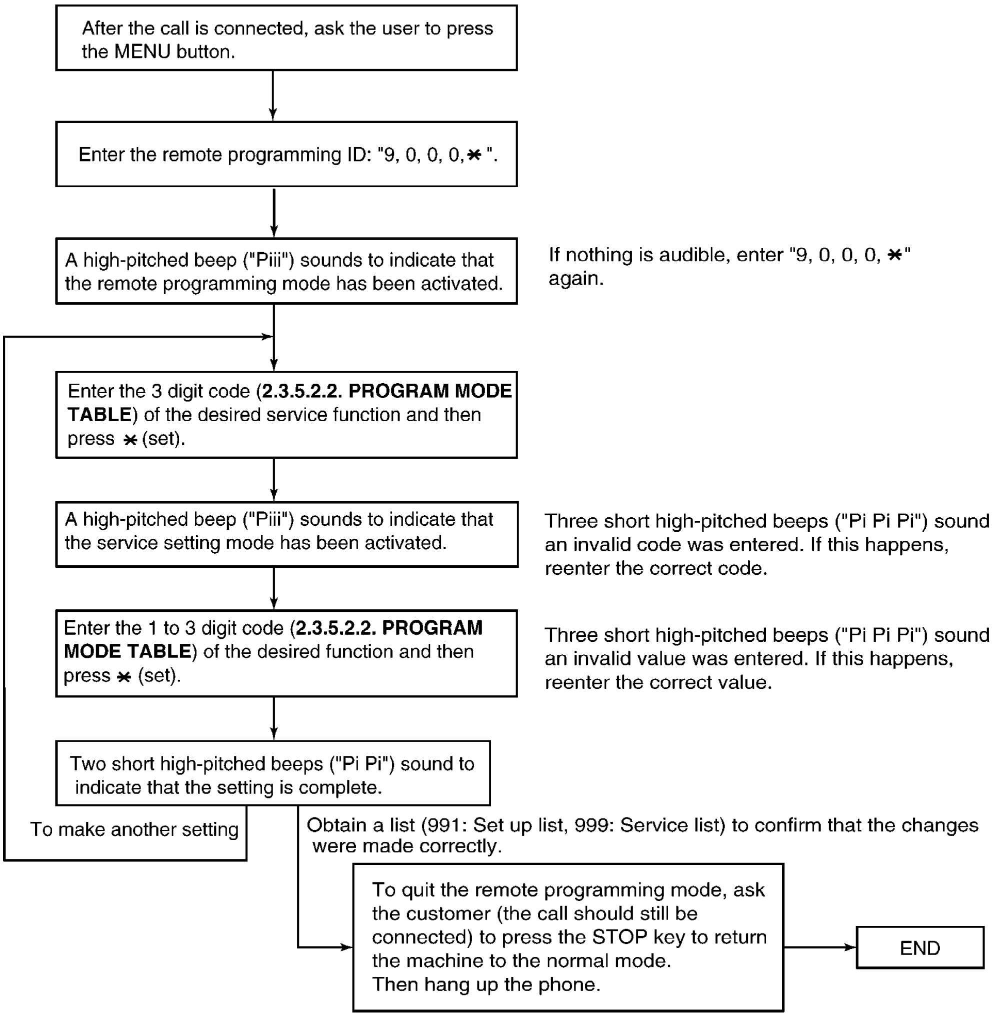
If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (Refer to PROGRAM MODE TABLE ()). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, out put the setup list (code: 991) and service list (code: 999) from the customer's fax machine. Based on this, the parameters for the desired codes can be changed. The procedure for changing and listing parameters is described on ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES (). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that only the desired parameters were changed.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone (except for a digital speakerphone). This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

2.3.5.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES



After the call is connected, ask the user to press the MENU button.

Enter the remote programming ID: "9, 0, 0, 0, *".

A high-pitched beep ("Piii") sounds to indicate that the remote programming mode has been activated.

If nothing is audible, enter "9, 0, 0, 0, *" again.

Enter the 3 digit code (**2.3.5.2.2. PROGRAM MODE TABLE**) of the desired service function and then press * (set).

A high-pitched beep ("Piii") sounds to indicate that the service setting mode has been activated.

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid code was entered. If this happens, reenter the correct code.

Enter the 1 to 3 digit code (**2.3.5.2.2. PROGRAM MODE TABLE**) of the desired function and then press * (set).

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid value was entered. If this happens, reenter the correct value.

Two short high-pitched beeps ("Pi Pi") sound to indicate that the setting is complete.

To make another setting

Obtain a list (991: Set up list, 999: Service list) to confirm that the changes were made correctly.

To quit the remote programming mode, ask the customer (the call should still be connected) to press the STOP key to return the machine to the normal mode. Then hang up the phone.

CROSS REFERENCE:

PROGRAM MODE TABLE ()

2.3.5.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	
001	Set the date and time	dd/mm/yy hh:mm	---------	
002	Your logo	---------	---------	
003	Your fax number	---------	---------	
004	Print transmission report	1:ERROR / 2:ON / 3:OFF	ERROR	
005	Auto receive mode	1:FAX ONLY / 2:TEL/FAX	FAX ONLY	
007	FAX ring count	1 to 4 rings	1 ring	
009	TEL/FAX delayed ring	1 to 4 rings	1 ring	
013	Dialing mode	1:PULSE / 2:TONE	TONE	
022	Journal auto print	1:ON / 2:OFF	ON	
023	Overseas mode	1:ON / 2:OFF	OFF	
025	Delayed send	1:ON / 2:OFF	OFF	
030	Silent FAX recognition ring	3 to 9 rings	3 rings	
031	Ring detection	1: A / 2:B / 3:C / 4:D / 5:OFF	OFF	
041	FAX activation code	ON/OFF	ON/ID=*9	
046	Friendly reception	1:ON / 2:OFF	ON	
048	Lauguage swith	ENGLISH/SPANISH	SPANISH	
049	Auto disconnect	ON/OFF	ON/ID=*0	
058	Original setting	1:NORMAL / 2 :LIGHT / 3: DARKER	NORMAL	
070	FAX pager	ON/OFF	OFF	
076	Connecting tone	1:ON / 2:OFF	ON	
080	Set the default	YES/NO	NO	
501	Pause time set	001~600 X 100 msec	050	
502	Flash time set	01~99 X 10 msec	70	
503	Dial speed set	1:10pps / 2:20 pps	10	
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	
521	International mode select	1:ON / 2:OFF	ON	
522	Auto standby select	1:ON / 2:OFF	ON	
523	Receive equalizer select	1:ON / 2:OFF	OFF	
524	SND EQL.	1:ON / 2:OFF	OFF	
531	Release PIN code for DIAL LOCK	1:ON / 2:NO	NO	
544	Document feed position adjustment value set	01~99 step	---------	
550	Memory clear	Press "START".	---------	
551	ROM check	Press "START".	---------	
553	Monitor on FAX communication select	1:OFF 2:P-B 3:ALL	OFF	
554	Modem test	Press "START".	---------	
555	Scanner test	Press "START".	---------	
556	Motor test	Press "START".	---------	
557	LED test	Press "START".	---------	

Code	Function	Set Value	Default	F
558	LCD test	Press "START".	---------	
559	Document jam detection select	1:ON / 2:OFF	ON	
561	Key test	Press any key.	---------	
570	Break % select	1:61% / 2:67%	61%	
571	ITS auto redial time set	00~99	05	
572	ITS auto redial line disconnection time set	001~999 set	065	
573	Remote turn-on ring number set	01~99	10	
590	FAX auto redial time set	00~99	05	
591	FAX auto redial line disconnection time set	001~999	065	
592	CNG transmit select	1:OFF/2:ALL/3:AUTO	ALL	
593	Time between CED and 300 bps	1:75/2:500/3:1s	75 ms	
594	Overseas DIS detection select	1:1st/2:2nd	1st	
595	Receive error limit value set	001~999	100	
596	Transmit level set	15~00dBm	-10	
598	Receiving Sensitivity	20~48	45	
717	Transmit speed select	1:9600/2:7200/3:4800/4: 2400bps	9600bps	
718	Receive speed select	1:9600/2:7200/3:4800/4: 2400bps	9600bps	
719	Ringer off in TEL/FAX mode	1:ON/2:OFF	ON	
721	Pause tone detect	1:ON/2:OFF	ON	
722	Redial tone detect	1:ON/2:OFF	ON	
763	Friendly reception CNG detection select	1:10S/2:20S/3:30S	20S	
771	T1 timer	1:35 sec/2:60 sec	35 sec	
774	T4 timer	00~99 X 100ms	00	
815	Sensor check	Press "START".	---------	
844	Original setting	1: NORMAL/2:LIGHT/3: DARKER	NORMAL	
991	Transmit basic list	1: START	---------	
992	Transmit advanced list	1: START	---------	
994	Transmit journal report	1: START	---------	
996	Journal 3	1: START	---------	
999	Transmit service list	1: START	---------	

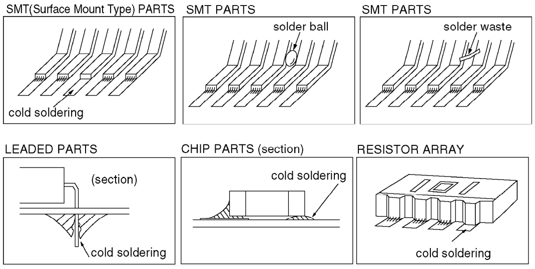
OK : Can set the value by the remote programming feature or print a list.
NG : Cannot set the value.

Note:
Note: Refer to SERVICE FUNCTION TABLE () for descriptions of the individual codes.

For example, the "004 Transmission report mode" set value "1:ERROR/2:ON/3:OFF" number corresponds to the number dialled.

2.3.6. DIGITAL BOARD SECTION

One of most difficult problems to deal with is when the system will not boot up.
The symptom: No response when the power is turned on. (No LCD display, keys are not accepted.)



Note:

1. **Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.**
2. **Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.**

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM and ROM) malfunctions are extremely rare after installation in the product.) / This may be repaired by replacing the IC, (ASIC etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead. / Soldering faults which are difficult to detect with the naked eye are common, particularly for an ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines. / Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved. / An explanation of the main signals (for booting up the unit) is below.

Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?
Please refer to the DIGITAL BLOCK DIAGRAM (). / The ASIC (including the CPU) (IC1) controls all the other digital ICs. When the power is turned on, the ASIC (CPU) retrieves the operation code stored in the ROM (IC2), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address. / It is the address bus by which the ASIC (CPU) designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC (CPU) to the ICs. / These signal lines are all controlled by voltages of 5V (H) / 3.3V (H) or 0V (L).

2.3.6.1. DIGITAL BLOCK DIAGRAM

The signal lines that must be normal for the system to boot up are listed here [List 1]. / For signal lines other than these, even if they malfunction they do not directly affect booting up the system.

[List 1]

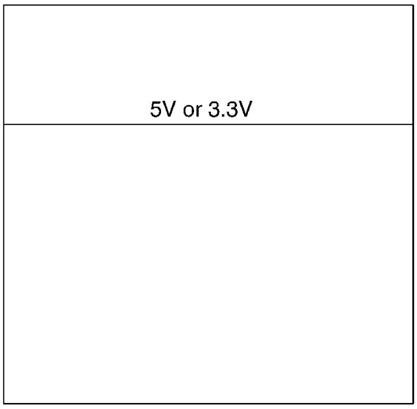
(1)	D0~D7	(Data Bus)
(2)	A0~A16	(Address Bus)
(3)	$\overline{RD}$	(Read Signal)
(4)	$\overline{WR}$	(Write Signal)
(5)	$\overline{ROMCS}$	(ROM Select Signal)
(6)	$\overline{RAMCS}$	(SRAM Select Signal)

If these signals are normal, once the power is turned on, each IC repeatedly outputs 5V or 3.3V (H) and 0V (L). The following page shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)

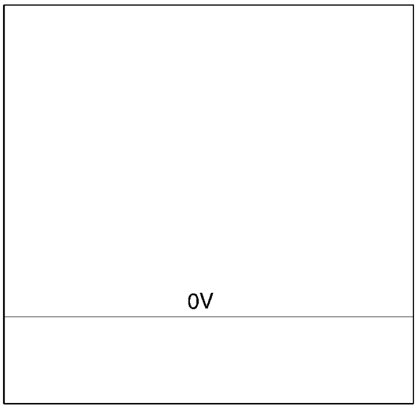
0V never appears.

NG

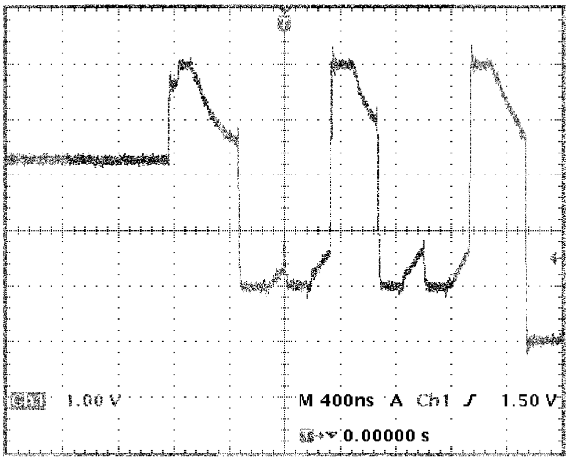


5V never appears.

NG



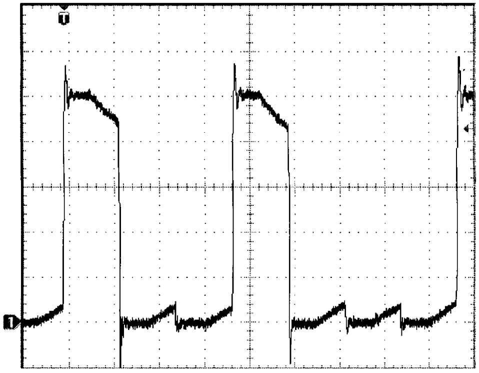
For a short between D0 and D1



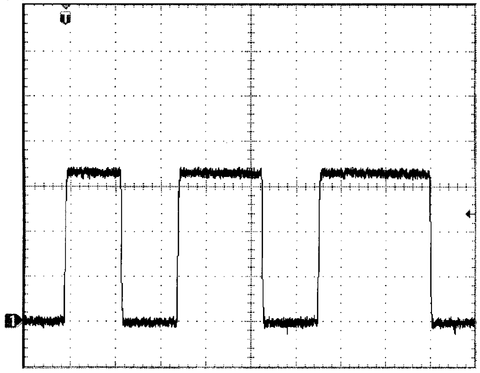
Normal Wave Patterns

OK

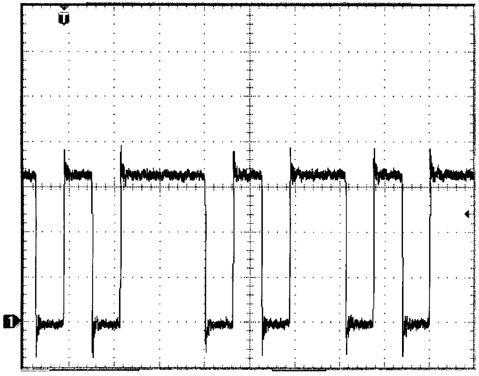
(1) D0~D7 200ns/div, 1v/div



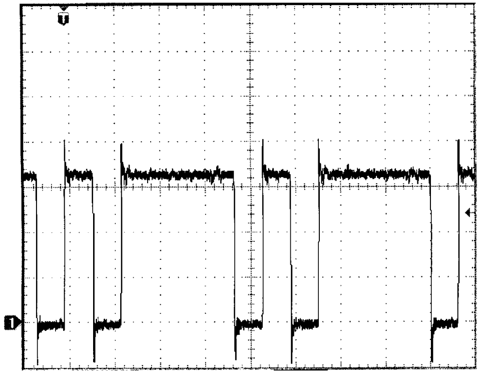
(2) A0~A17 200ns/div, 1v/div



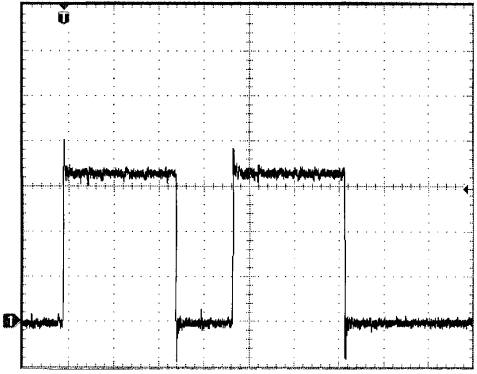
(3) $\overline{RD}$ 200ns/div, 1v/div



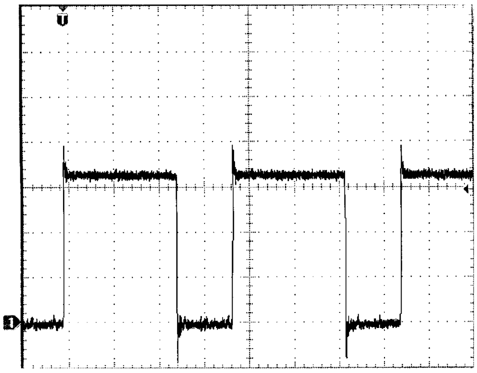
(4) $\overline{WR}$ 200ns/div, 1v/div



(5) $\overline{ROMCS}$ 200ns/div, 1v/div



(6) $\overline{RAMCS}$ 200ns/div, 1v/div



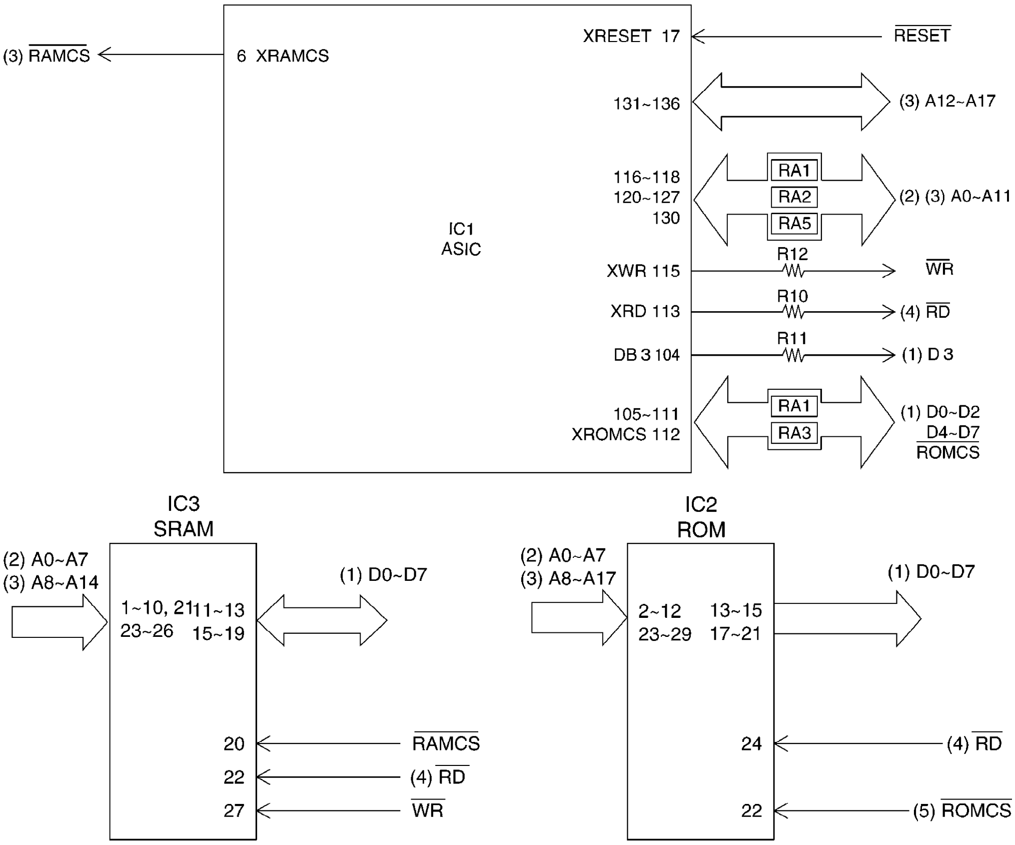
For these reasons and the software sequence to boot up the unit, if you use an oscilloscope to judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (If the ASIC (CPU) failed to access the ROM, the ASIC cannot access the SRAM normally.)

The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even of the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.) / Accordingly, the problem

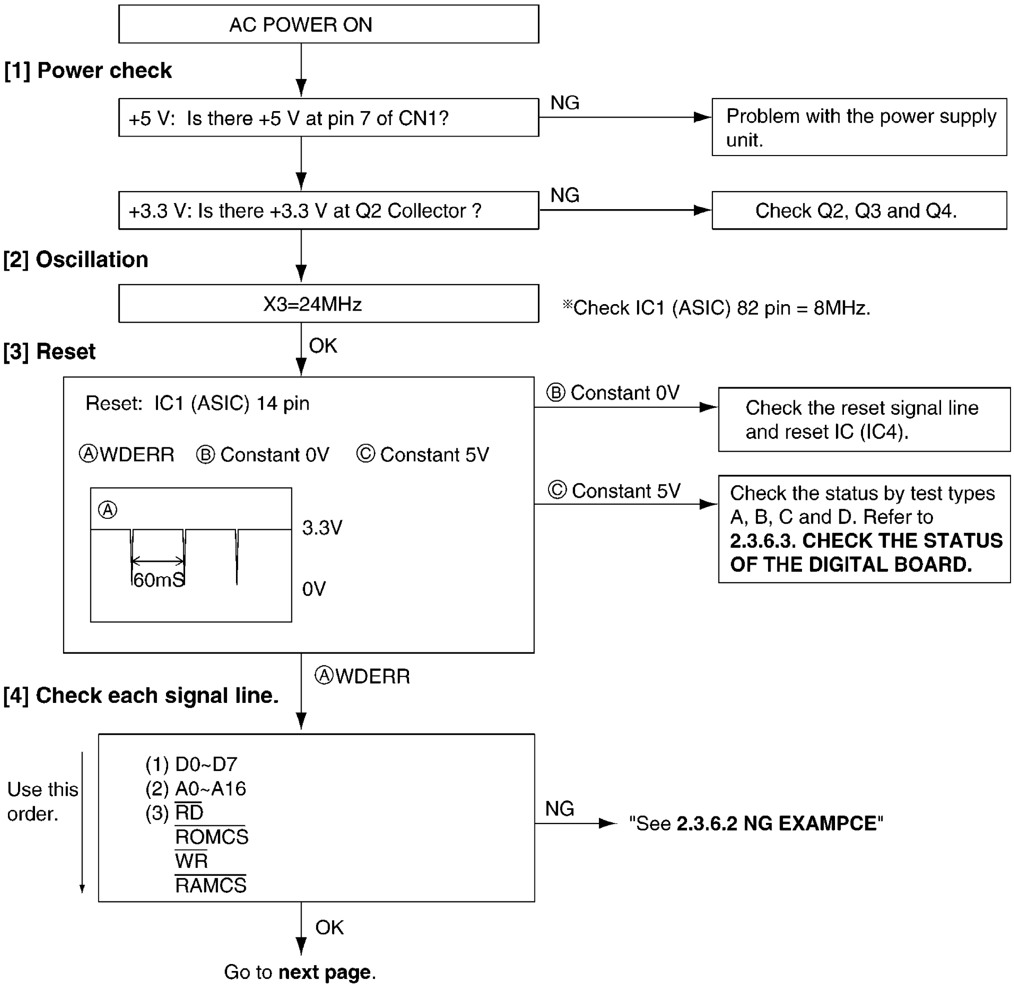
presented here is whether each IC outputs the correct signal. (See the I/O and Pin No. diagram.) In other words, is it constantly switching between 5V or 3.3V (H) and 0V (L) as described earlier.

All you have to do is check that the IC repeatedly outputs (H) 5V or 3.3V and (L) 0V.

I/O and Pin No. Diagram


(3) RAMCS
6 XRAMCS
XRESET 17
RESET
131~136
(3) A12~A17
116~118
120~127
130
RA1
RA2
RA5
(2) (3) A0~A11
IC1
ASIC
R12
XWR 115
WR
R10
XRD 113
(4) RD
R11
DB 3 104
(1) D 3
105~111
XROMCS 112
RA1
RA3
(1) D0~D2
D4~D7
ROMCS
IC3
SRAM
(2) A0~A7
(3) A8~A14
1~10, 21
23~26
11~13
15~19
(1) D0~D7
20
RAMCS
22
(4) RD
27
WR
IC2
ROM
(2) A0~A7
(3) A8~A17
2~12
23~29
13~15
17~21
(1) D0~D7
24
(4) RD
22
(5) ROMCS

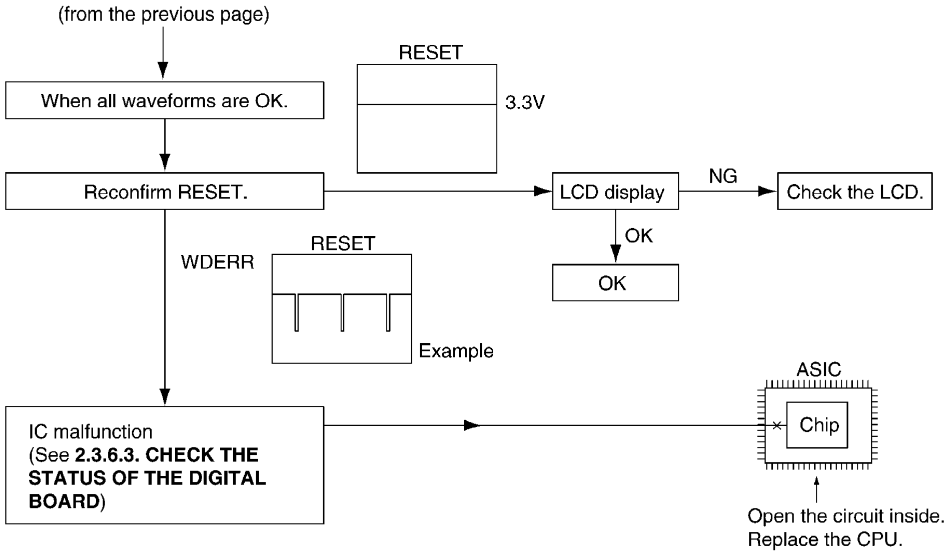
After the power is turned on, the ASIC (CPU) initializes and checks each IC.
The ROM and SRAM are checked.
If initialization fails for the ICs, the system will not boot up.


AC POWER ON
[1] Power check
+5 V: Is there +5 V at pin 7 of CN1?
NG
Problem with the power supply unit.
+3.3 V: Is there +3.3 V at Q2 Collector ?
NG
Check Q2, Q3 and Q4.
[2] Oscillation
X3=24MHz
※Check IC1 (ASIC) 82 pin = 8MHz.
[3] Reset
OK
Reset: IC1 (ASIC) 14 pin
ⒶWDERR Ⓑ Constant 0V Ⓒ Constant 5V
Ⓐ
60mS
3.3V
0V
Ⓑ Constant 0V
Check the reset signal line and reset IC (IC4).
Ⓒ Constant 5V
Check the status by test types A, B, C and D. Refer to 2.3.6.3. CHECK THE STATUS OF THE DIGITAL BOARD.
ⒶWDERR
[4] Check each signal line.
Use this order.
(1) D0~D7
(2) A0~A16
(3) RD
ROMCS
WR
RAMCS
NG
"See 2.3.6.2 NG EXAMPCE"
OK
Go to next page.

CROSS REFERENCE:

NG EXAMPLE ()

CHECK THE STATUS OF THE DIGITAL BOARD ()


(from the previous page)
When all waveforms are OK.
RESET
3.3V
Reconfirm RESET.
LCD display
NG
Check the LCD.
OK
OK
WDERR
RESET
Example
ASIC
Chip
IC malfunction
(See 2.3.6.3. CHECK THE STATUS OF THE DIGITAL BOARD)
Open the circuit inside.
Replace the CPU.

Other NG examples while the power is ON and the LCD displays the following.

LCD display CALL SERVICE 1 → This display occurs when the temperature of the thermistor on the terminal head is NG.
Faulty connection of the thermal head connector.

↓

ASIC IC1 pins 193 and 207 or the thermistor on the thermal head is NG.

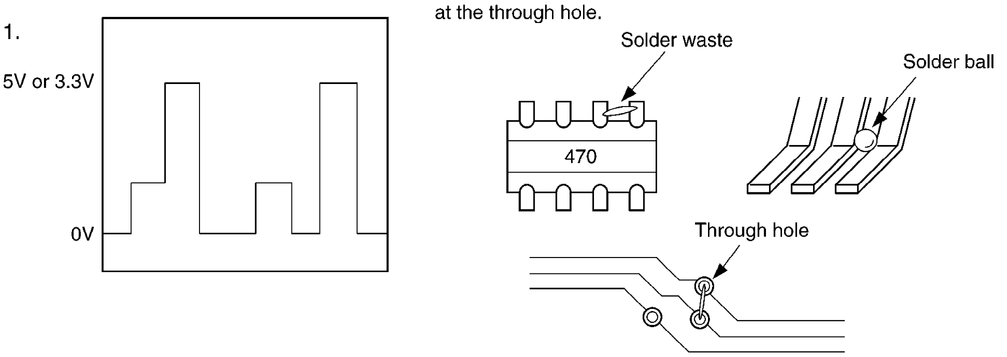
CROSS REFERENCE:

CHECK THE STATUS OF THE DIGITAL BOARD ()

2.3.6.2. NG EXAMPLE

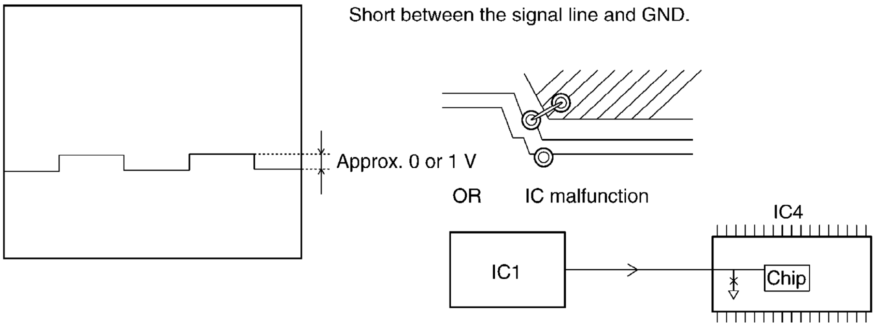
1.

Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.

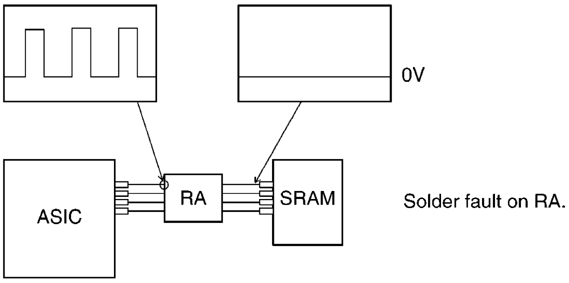

5V or 3.3V
0V
Solder waste
Solder ball
470
Through hole

2.

Short between the signal line and GND.


Approx. 0 or 1 V
OR
IC malfunction
IC4
IC1
Chip

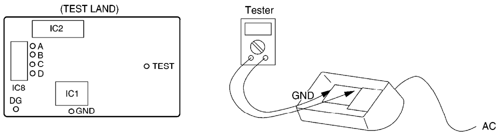
3.


0V
ASIC
RA
SRAM

Solder fault on RA.

2.3.6.3. CHECK THE STATUS OF THE DIGITAL BOARD

Put the unit in the test mode and check the voltage at lands A, B, C and D.



Turn off the power supply.
Short using a metallic object, such as tweezers, between the TEST and GND land, and turn on the AC power.
Check the following after turning on the power, using an oscilloscope or tester.
To cancel the status check mode, turn off the AC power.

Item	Check point voltage				Check points
	A	B	C	D	
CLOCK(IC1)	5V	0V	0V	0V	IC1
MODEM(IC1)	0V	5V	0V	0V	IC1
S-RAM(IC3)	0V	0V	5V	0V	IC3 (20 pin), IC1 (6 pin), IC3
ASIC(IC1)	0V	0V	0V	5V	RA1~RA5, R10, R12 and R11 IC1(104~136 pins)
ALL OK	5V	5V	0V	0V	

This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all completely connected to the CPU and that control from the CPU is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

If you still have a problem with the digital board, Please see "checking details". (Refer to **NG wave patterm**.)

To cancel the status check mode, turn off the AC power.

2.3.7. ANALOG BOARD SECTION

The analog parts check is actually different than the digital parts check. The signal route is determined by the purpose of the check. For example, the handset TX route begins from the handset microphone and is output in the telephone line. In this route, it is mainly an analog signal. Tracing the signal can be done easily using an oscilloscope. Each route is shown on the CHECK SHEET ()here. If there is a problem with the unit (for example, you cannot communicate with the H/S, etc.), trace the signal in the area and determine the cause.

2.3.7.1. CHECK SHEET

(SYMPTOM) ITEMS TO CHECK		IN signal → ROUTE → OUT
Monitor		TEL LINE-L1-R14-R12-T2-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(9-8)-C52-R42-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER
Handset Tx		MIC┬L5-C54-R49┬IC2(2, 3-1)-CN1(15)-{CN9(15)-R62-C66-R131-C60-R51-IC9(2-1)-CN9(11)}- └L8-C53-R48┘ CN1(11)-C30-R31-T2-R12-R14-L1-TEL LINE
Handset Rx		TEL LINE-L1-R14-R12-T2-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(9-8)-C52-R42-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-R60-C63-IC6(4-3)-C65-CN9(17)}-CN1(17)-R64-Q2(Base-Collector)-C47-CN3-HANDSET SPEAKER
DTMF	Monitor	{IC5(3)-C48-R37-R38-IC8(6-7)-C54-R44-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER
	Handset	{IC5(3)-C48-R37-R38-IC8(6-7)-C54-R44-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-R60-C63-IC6(4-3)-C65-CN9(17)}-CN1(17)-R64-Q2(Base-Collector)-C47-CN3-SHANDSET SPEAKER
DTMF TEL LINE FAX Tx DUMMY Ring Back Tone		{IC5(3)-C48-R37-R38-IC8(6-7)-C53-IC6(2-1)-C58-R49-IC9(2-1)-CN9(11)}-CN1(11)-C30-R31-T2-R12-R14-L1-TEL LINE
Ringing/Alarm Beep/Keytone		{IC1(59)-R28-C45-R35-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER
FAX Rx		TEL LINE-L1-R14-R12-T2-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(10-11)-R33-C43-IC5(15)}
DTMF detection		TEL LINE–L2-RL1(3-5)(detection for Ext.TEL)–CN5-C11-R17-T2-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(10-11)-R33-C43-IC5(15)}

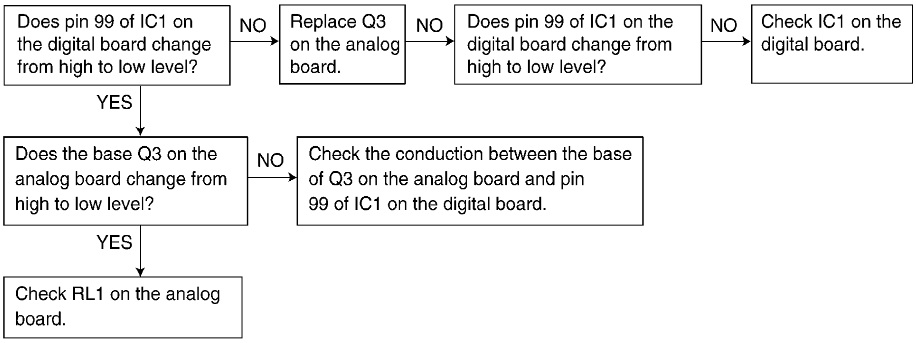
Note:
{ }: Inside the digital board /

2.3.7.2. DEFECTIVE ITS (INTEGRATED TELEPHONE SYSTEM) SECTION

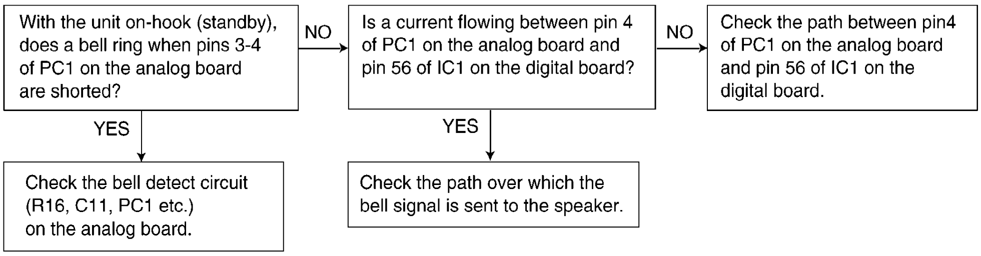
a. No handset and monitor transmission/reception

Following the ITS section or NCU section, search for the route between the microphone and the telephone line (sending) or between the telephone line and the speaker (receiving) where the signal disappears. Check the components at that point.

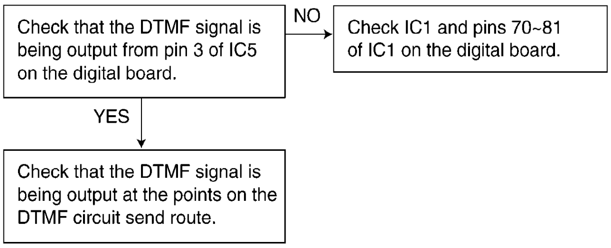
b. No pulse dialling


Does pin 99 of IC1 on the digital board change from high to low level?
NO
Replace Q3 on the analog board.
NO
Does pin 99 of IC1 on the digital board change from high to low level?
NO
Check IC1 on the digital board.
YES
Does the base Q3 on the analog board change from high to low level?
NO
Check the conduction between the base of Q3 on the analog board and pin 99 of IC1 on the digital board.
YES
Check RL1 on the analog board.

c. Not ring tone


With the unit on-hook (standby), does a bell ring when pins 3-4 of PC1 on the analog board are shorted?
NO
Is a current flowing between pin 4 of PC1 on the analog board and pin 56 of IC1 on the digital board?
NO
Check the path between pin4 of PC1 on the analog board and pin 56 of IC1 on the digital board.
YES
Check the bell detect circuit (R16, C11, PC1 etc.) on the analog board.
YES
Check the path over which the bell signal is sent to the speaker.

d. No tone dialling


Check that the DTMF signal is being output from pin 3 of IC5 on the digital board.
NO
Check IC1 and pins 70~81 of IC1 on the digital board.
YES
Check that the DTMF signal is being output at the points on the DTMF circuit send route.

2.3.8. POWER SUPPLY BOARD SECTION

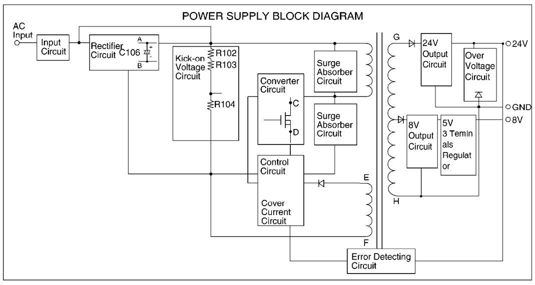
1. Key components for troubleshooting
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.
This comes from our experience with experimental tests. / For example: power supply and lightning surge voltage test, with standing voltage test, intentional short circuit test, etc.

Caution:

If you find a melted fuse in the unit, do not turn on the power until

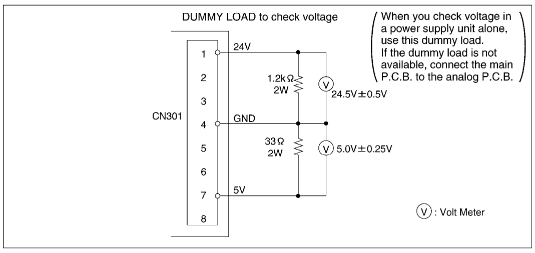
you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.



POWER SUPPLY BLOCK DIAGRAM

AC Input
Input Circuit
Rectifier Circuit
C106
A
B
+
-
Kick-on Voltage Circuit
R102
R103
R104
Converter Circuit
C
D
Surge Absorber Circuit
Surge Absorber Circuit
Control Circuit
Cover Current Circuit
E
F
G
H
24V Output Circuit
Over Voltage Circuit
24V
GND
8V
8V Output Circuit
5V 3 Temin als Regulat or
Error Detecting Circuit

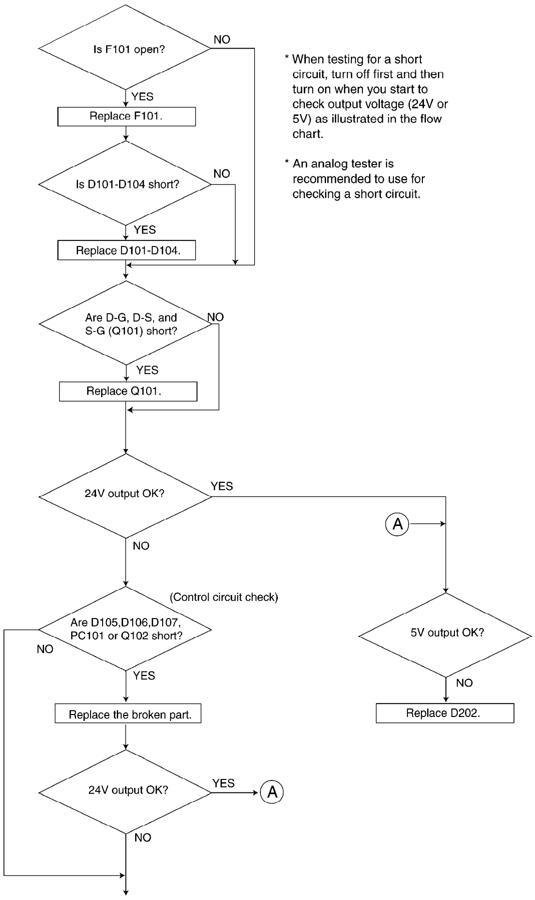


DUMMY LOAD to check voltage

(When you check voltage in a power supply unit alone, use this dummy load.
If the dummy load is not available, connect the main P.C.B. to the analog P.C.B.)

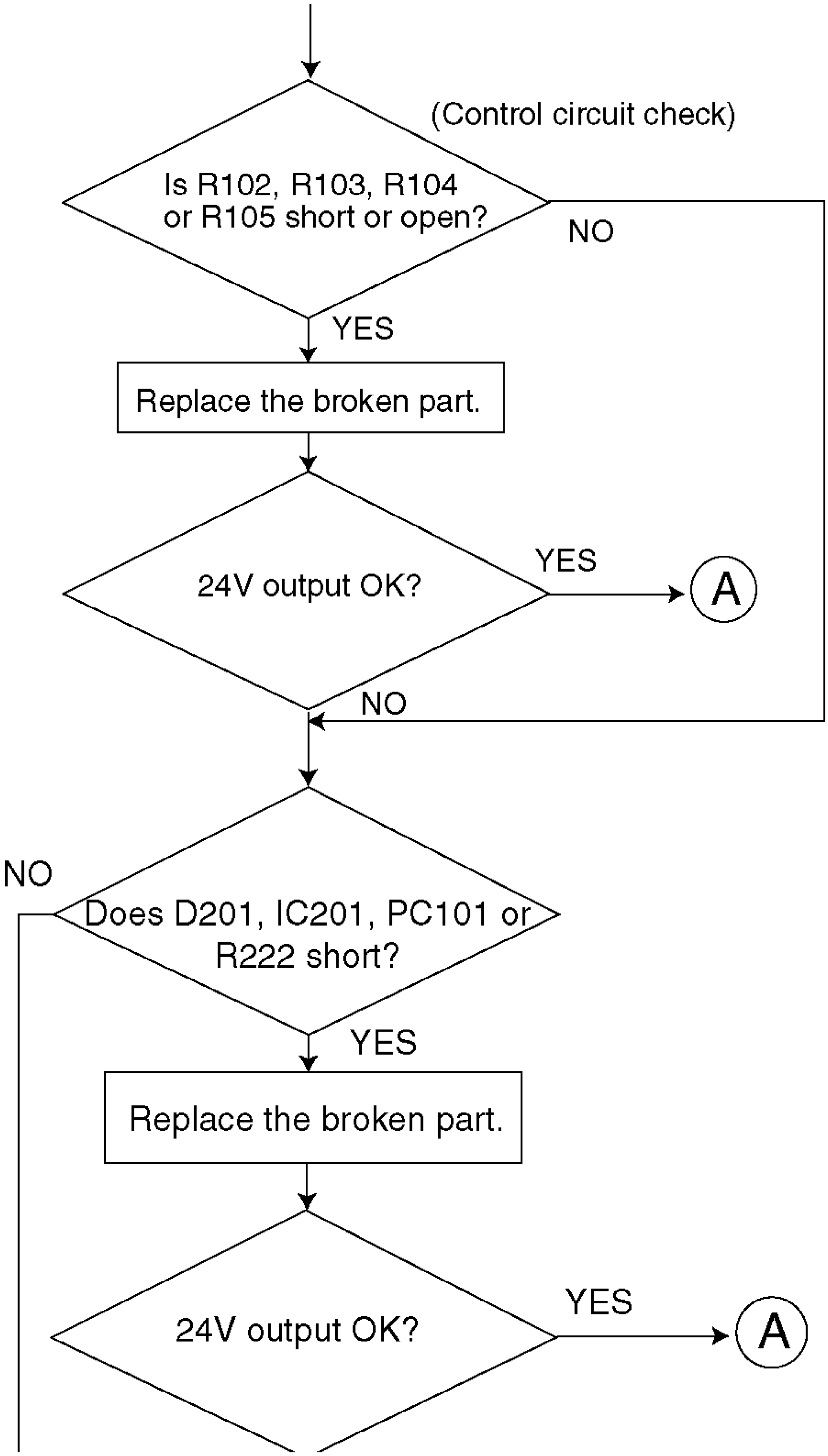
CN301
1
2
3
4
5
6
7
8
24V
GND
5V
1.2kΩ 2W
33Ω 2W
V
24.5V±0.5V
V
5.0V±0.25V
V : Volt Meter

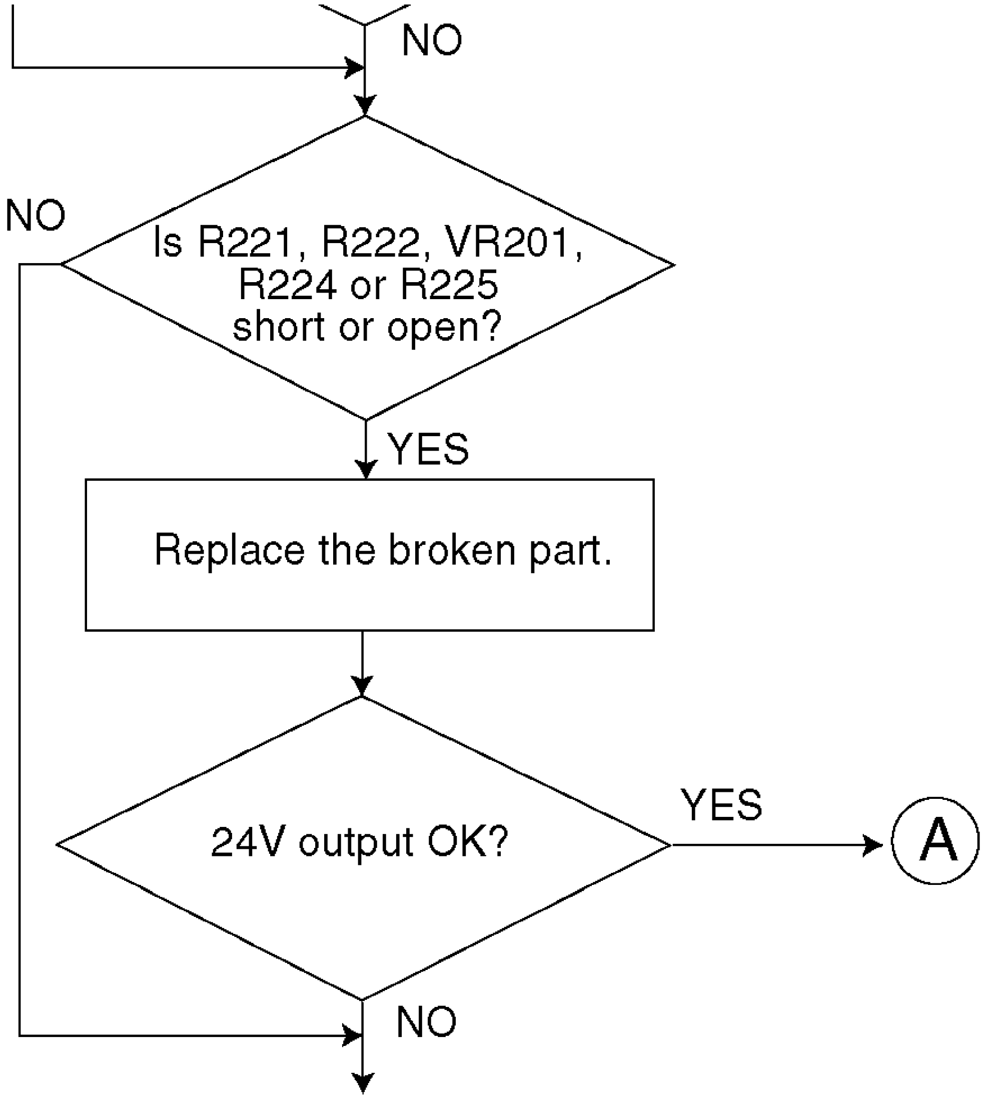
2. Troubleshooting Flow Chart

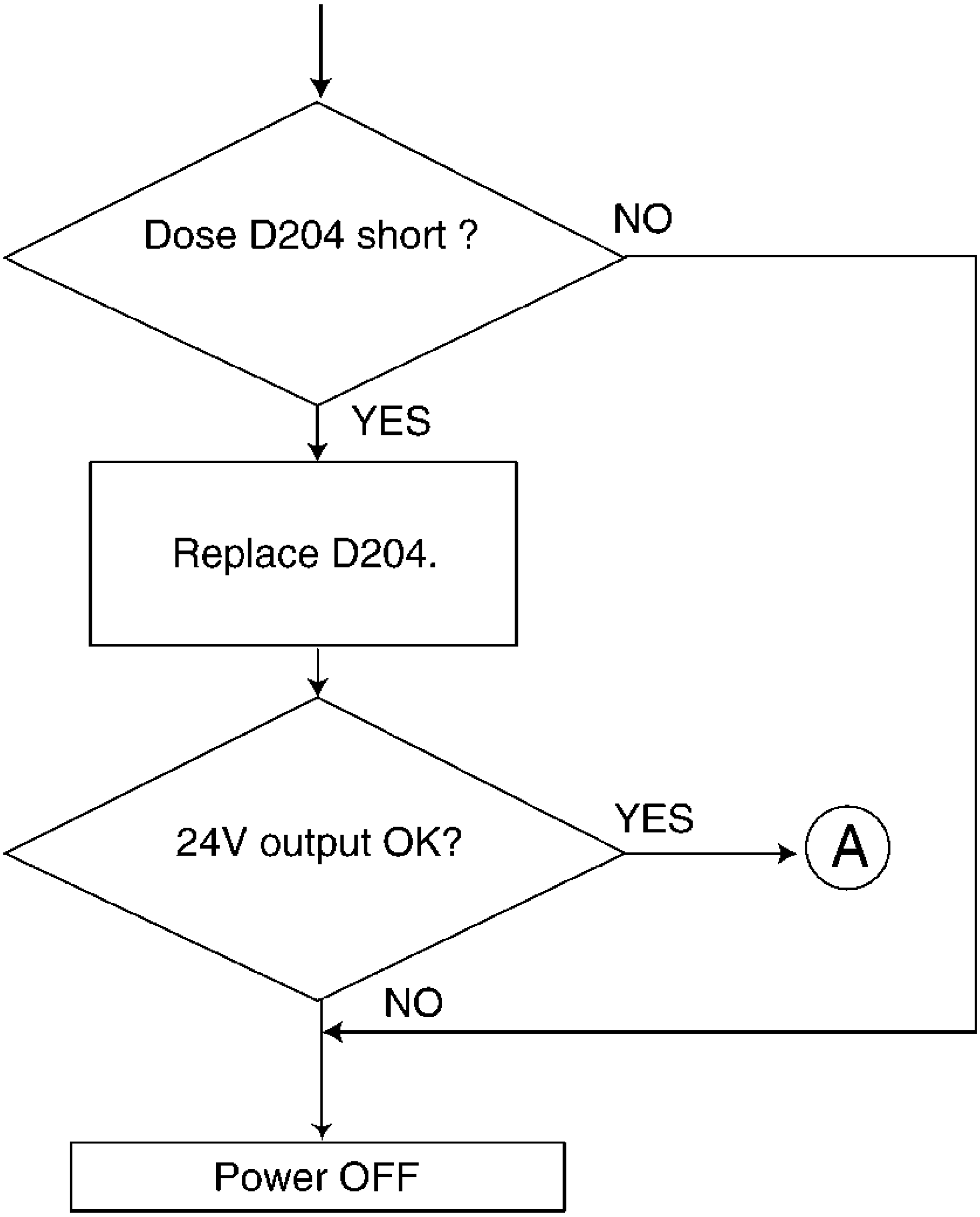

Is F101 open?
NO
YES
Replace F101.
Is D101-D104 short?
NO
YES
Replace D101-D104.
Are D-G, D-S, and S-G (Q101) short?
NO
YES
Replace Q101.
24V output OK?
YES
NO
A
(Control circuit check)
Are D105,D106,D107, PC101 or Q102 short?
NO
YES
Replace the broken part.
24V output OK?
YES
A
NO
5V output OK?
NO
Replace D202.

* When testing for a short circuit, turn off first and then turn on when you start to check output voltage (24V or 5V) as illustrated in the flow chart.

* An analog tester is recommended to use for checking a short circuit.


(Control circuit check)
Is R102, R103, R104 or R105 short or open?
NO
YES
Replace the broken part.
24V output OK?
YES
A
NO
NO
Does D201, IC201, PC101 or R222 short?
YES
Replace the broken part.
24V output OK?
YES
A


NO
NO
Is R221, R222, VR201, R224 or R225 short or open?
YES
Replace the broken part.
24V output OK?
YES
A
NO


Dose D204 short ?
NO
YES
Replace D204.
24V output OK?
YES
A
NO
Power OFF

3. Broken parts repair details

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuited, F101 will melt (open).

In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.

This is due to a very high voltage through the Gate circuit which is composed of R107, R109, D106 and IC101.

You should change all of the parts listed as follows.

F101, Q101, R105, Q102, D107

(D201)

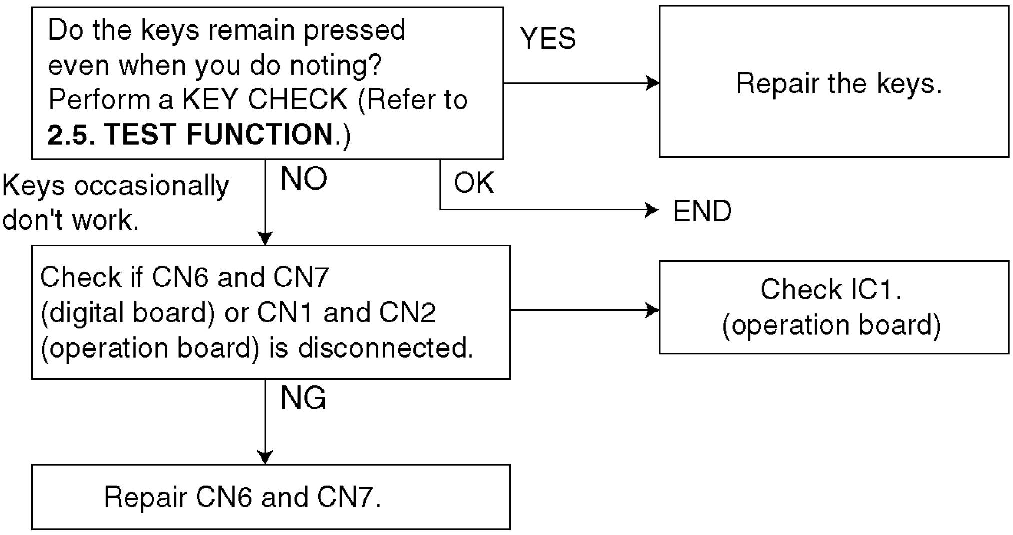
If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

(D204)

If D204 shorts, the voltage feedback circuit is almost always the cause. / Replace the following parts if this happens. / PC101, Q102, D203, D106, D105, D107

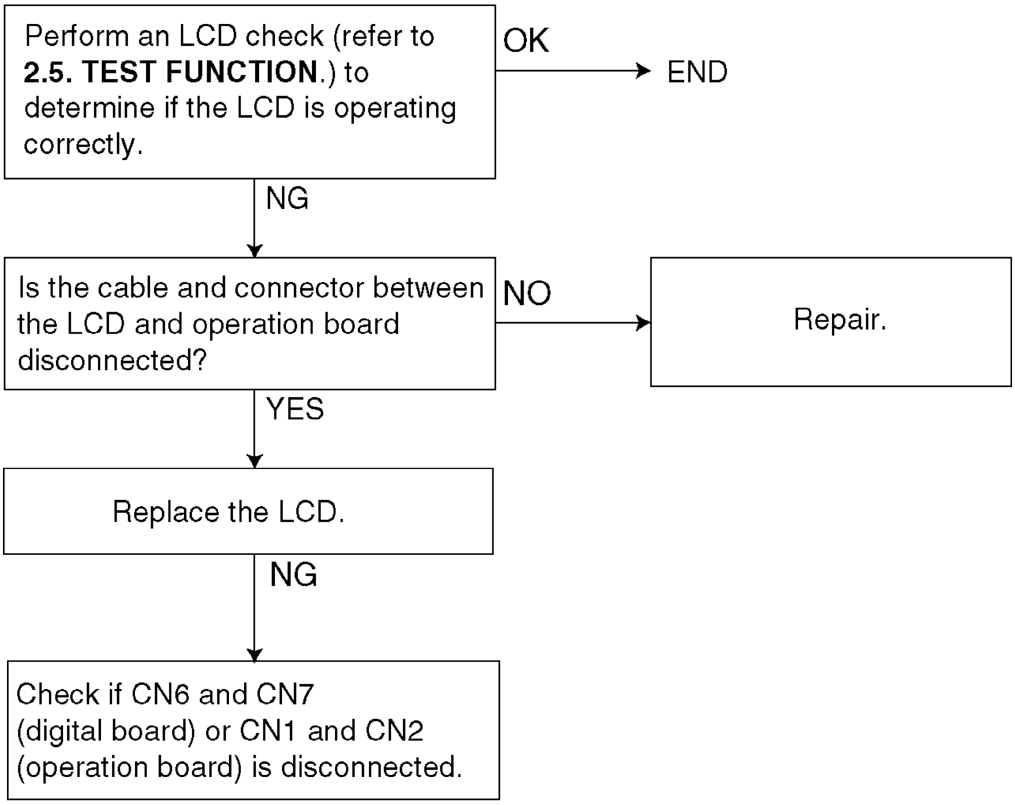
2.3.9. OPERATION BOARD SECTION

2.3.9.1. NO KEY OPERATION


Do the keys remain pressed even when you do noting? Perform a KEY CHECK (Refer to **2.5. TEST FUNCTION**.)
YES
Repair the keys.
Keys occasionally don't work.
NO
OK
END
Check if CN6 and CN7 (digital board) or CN1 and CN2 (operation board) is disconnected.
Check IC1. (operation board)
NG
Repair CN6 and CN7.

CROSS REFERENCE:
TEST FUNCTIONS ()

2.3.9.2. NO LCD INDICATION

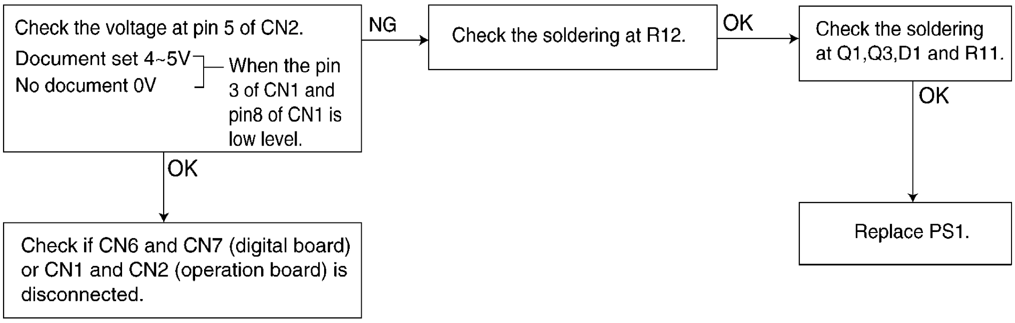

Perform an LCD check (refer to 2.5. TEST FUNCTION.) to determine if the LCD is operating correctly.
OK
END
NG
Is the cable and connector between the LCD and operation board disconnected?
NO
Repair.
YES
Replace the LCD.
NG
Check if CN6 and CN7 (digital board) or CN1 and CN2 (operation board) is disconnected.

CROSS REFERENCE:
TEST FUNCTIONS ()

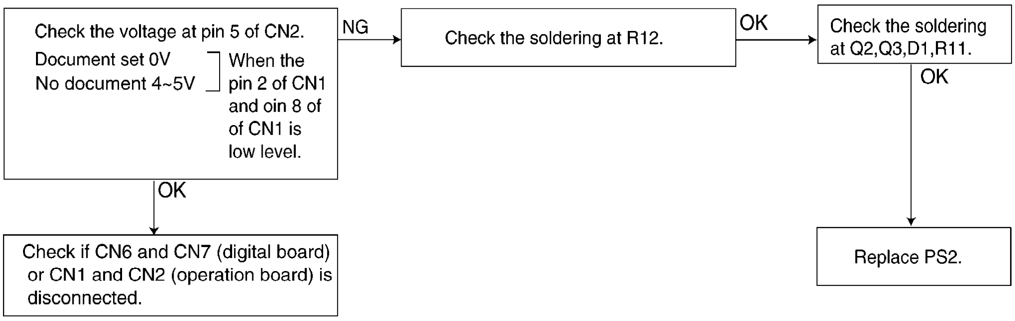
2.3.10. SENSOR SECTION

Refer to SENSORS AND SWITCHES () for the circuit descriptions.
Refer to LCD MESSAGE ().

2.3.10.1. CHECK THE DOCUMENT SENSOR (PS1)................."REMOVE DOCUMENT" /

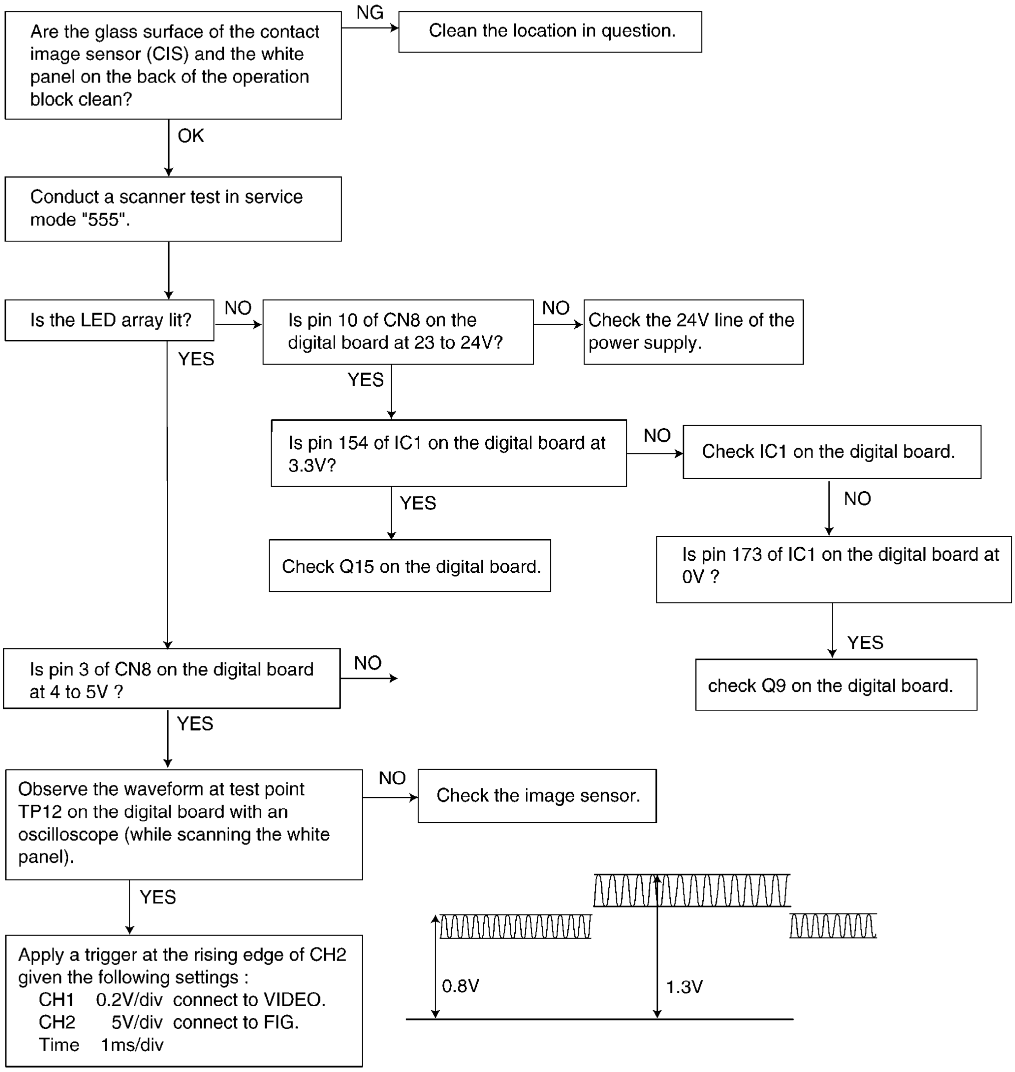

Check the voltage at pin 5 of CN2.
Document set 4~5V
No document 0V
When the pin 3 of CN1 and pin8 of CN1 is low level.
NG
Check the soldering at R12.
OK
Check the soldering at Q1,Q3,D1 and R11.
OK
Replace PS1.
OK
Check if CN6 and CN7 (digital board) or CN1 and CN2 (operation board) is disconnected.

2.3.10.2. CHECK THE READ POSITION SENSOR (PS2)................."CHECK DOCUMENT" /


Check the voltage at pin 5 of CN2.
Document set 0V
No document 4~5V
When the pin 2 of CN1 and oin 8 of of CN1 is low level.
NG
Check the soldering at R12.
OK
Check the soldering at Q2,Q3,D1,R11.
OK
Replace PS2.
OK
Check if CN6 and CN7 (digital board) or CN1 and CN2 (operation board) is disconnected.

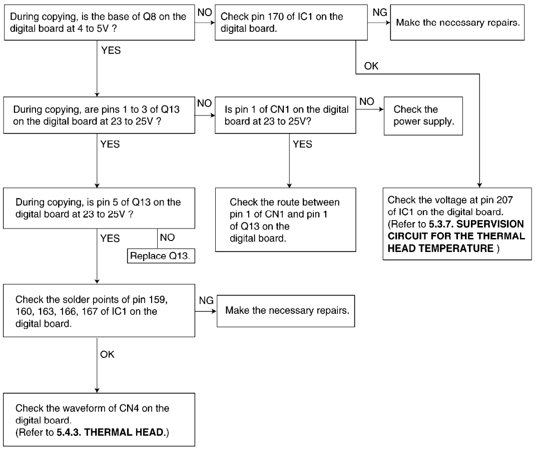
2.3.11. READ SECTION

Refer to SCANNING BLOCK ().


Are the glass surface of the contact image sensor (CIS) and the white panel on the back of the operation block clean?
NG
Clean the location in question.
OK
Conduct a scanner test in service mode "555".
Is the LED array lit?
NO
Is pin 10 of CN8 on the digital board at 23 to 24V?
NO
Check the 24V line of the power supply.
YES
Is pin 154 of IC1 on the digital board at 3.3V?
NO
Check IC1 on the digital board.
NO
Is pin 173 of IC1 on the digital board at 0V ?
YES
check Q9 on the digital board.
YES
Check Q15 on the digital board.
YES
Is pin 3 of CN8 on the digital board at 4 to 5V ?
NO
YES
Observe the waveform at test point TP12 on the digital board with an oscilloscope (while scanning the white panel).
NO
Check the image sensor.
YES
Apply a trigger at the rising edge of CH2 given the following settings :
CH1 0.2V/div connect to VIDEO.
CH2 5V/div connect to FIG.
Time 1ms/div
0.8V
1.3V

2.3.12. THERMAL HEAD SECTION

Refer to THERMAL HEAD ().


During copying, is the base of Q8 on the digital board at 4 to 5V ?
NO
Check pin 170 of IC1 on the digital board.
NG
Make the necessary repairs.
YES
OK
During copying, are pins 1 to 3 of Q13 on the digital board at 23 to 25V ?
NO
Is pin 1 of CN1 on the digital board at 23 to 25V?
NO
Check the power supply.
YES
YES
During copying, is pin 5 of Q13 on the digital board at 23 to 25V ?
Check the route between pin 1 of CN1 and pin 1 of Q13 on the digital board.
Check the voltage at pin 207 of IC1 on the digital board. (Refer to 5.3.7. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE)
YES
NO
Replace Q13.
Check the solder points of pin 159, 160, 163, 166, 167 of IC1 on the digital board.
NG
Make the necessary repairs.
OK
Check the waveform of CN4 on the digital board. (Refer to 5.4.3. THERMAL HEAD.)

CROSS REFERENCE:
SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE ()
THERMAL HEAD ()

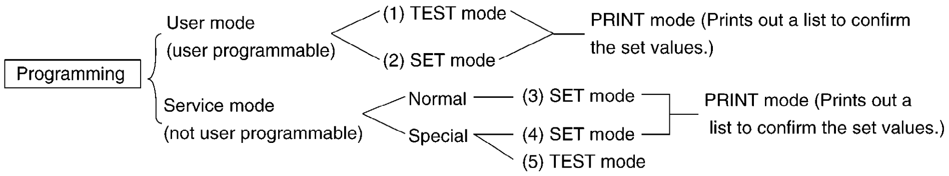
2.4. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine. / Programming can be done in both the on-hook and off-hook conditions. This facilitates communication between the user and the service while programming the machine.

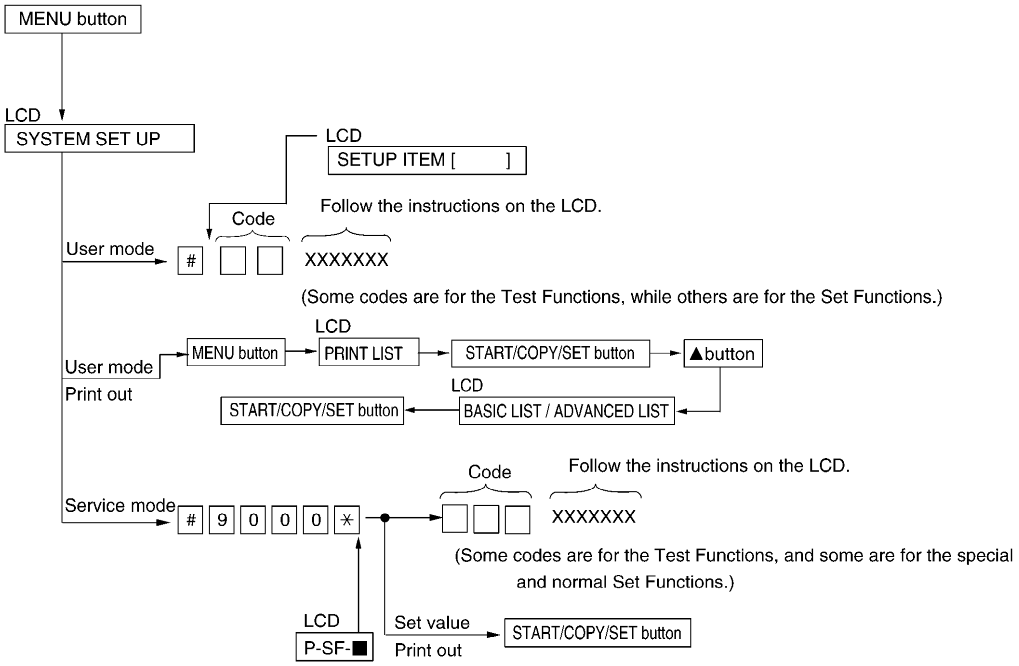
2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. / The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. / The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

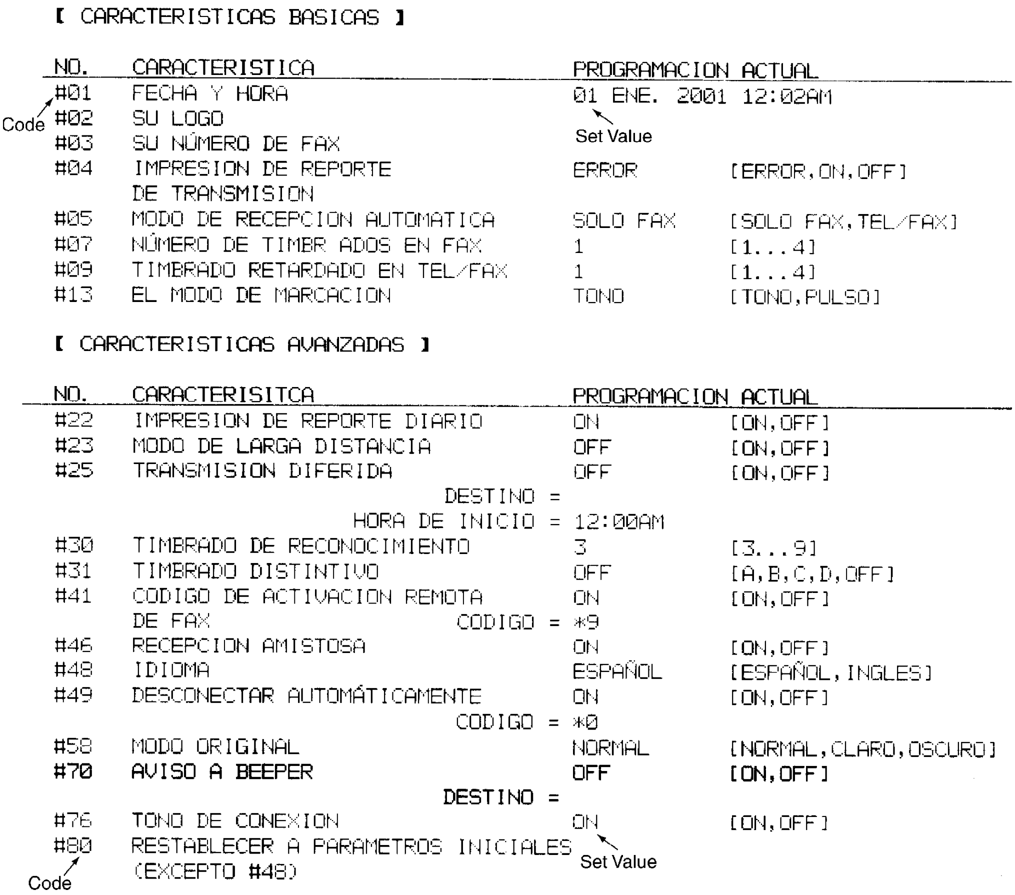
2.4.2. OPERATION FLOW


Programming
User mode
(user programmable)
(1) TEST mode
(2) SET mode
PRINT mode (Prints out a list to confirm the set values.)
Service mode
(not user programmable)
Normal
Special
(3) SET mode
(4) SET mode
(5) TEST mode
PRINT mode (Prints out a list to confirm the set values.)

Operating Procedure


MENU button
LCD
SYSTEM SET UP
LCD
SETUP ITEM [ ]
Code
Follow the instructions on the LCD.
User mode
#
XXXXXXX
(Some codes are for the Test Functions, while others are for the Set Functions.)
LCD
User mode
Print out
MENU button
PRINT LIST
START/COPY/SET button
▲button
LCD
START/COPY/SET button
BASIC LIST / ADVANCED LIST
Code
Follow the instructions on the LCD.
Service mode
# 9 0 0 0 *
XXXXXXX
(Some codes are for the Test Functions, and some are for the special and normal Set Functions.)
LCD
P-SF-■
Set value
Print out
START/COPY/SET button

2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)


Code
Set Value
Set Value
Code

```
[ CARACTERISTICAS BASICAS ]

NO.   CARACTERISTICA                        PROGRAMACION ACTUAL
#01   FECHA Y HORA                          01 ENE.  2001  12:02AM
#02   SU LOGO
#03   SU NÚMERO DE FAX
#04   IMPRESION DE REPORTE                  ERROR        [ERROR,ON,OFF]
      DE TRANSMISION
#05   MODO DE RECEPCION AUTOMATICA          SOLO FAX     [SOLO FAX,TEL/FAX]
#07   NÚMERO DE TIMBR ADOS EN FAX           1            [1...4]
#09   TIMBRADO RETARDADO EN TEL/FAX         1            [1...4]
#13   EL MODO DE MARCACION                  TONO         [TONO,PULSO]

[ CARACTERISTICAS AVANZADAS ]

NO.   CARACTERISITCA                        PROGRAMACION ACTUAL
#22   IMPRESION DE REPORTE DIARIO           ON           [ON,OFF]
#23   MODO DE LARGA DISTANCIA               OFF          [ON,OFF]
#25   TRANSMISION DIFERIDA                  OFF          [ON,OFF]
                                  DESTINO =
                          HORA DE INICIO =  12:00AM
#30   TIMBRADO DE RECONOCIMIENTO            3            [3...9]
#31   TIMBRADO DISTINTIVO                   OFF          [A,B,C,D,OFF]
#41   CODIGO DE ACTIVACION REMOTA           ON           [ON,OFF]
      DE FAX                       CODIGO = *9
#46   RECEPCION AMISTOSA                    ON           [ON,OFF]
#48   IDIOMA                                ESPAÑOL      [ESPAÑOL,INGLES]
#49   DESCONECTAR AUTOMÁTICAMENTE           ON           [ON,OFF]
                                   CODIGO = *0
#58   MODO ORIGINAL                         NORMAL       [NORMAL,CLARO,OSCURO]
#70   AVISO A BEEPER                        OFF          [ON,OFF]
                                  DESTINO =
#76   TONO DE CONEXION                      ON           [ON,OFF]
#80   RESTABLECER A PARAMETROS INICIALES
      (EXCEPTO #48)
```

Note:
The above values are the default values.

2.4.4. SERVICE FUNCTION TABLE

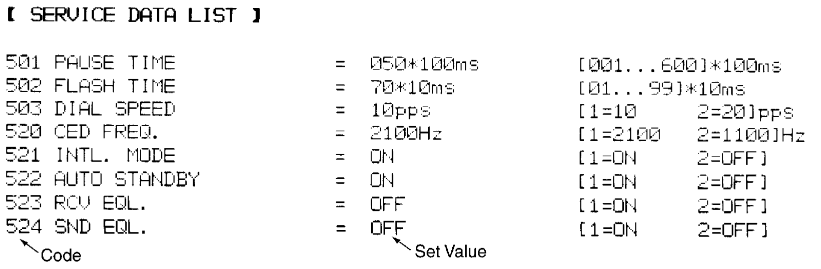
Code	Function	Set Value	Effective Range	Default	Remarks
501	Setting the pause time	001~600 X 100 msec	001~600	050	Selects the pause time in msec steps.
502	Setting the flash recall time	01~99 X 10 msec	01~99	70	Selects the line break time flashing in 10 msec steps.
503	Setting the pulse dial speed	1:10pps 2:20pps	1, 2	1	Sets the pulse dial speed.
520	Setting the CED frequency	1:2100Hz 2: 1100Hz	1, 2	1	When international communications cannot b performed smoothly selec 1100Hz. However some ex system should not be acc (1100Hz on CED). (See "5. copy, but cannot transmit/ long distance or internatio communications" in DEFE FACSIMILE SECTION ().)
521	Setting the international line mode	1:ON 2:OFF	1, 2	1	Selects the international li during FAX communicatio "5. Unit can copy, but can transmit/receive long dist international communicati DEFECTIVE FACSIMILE S ().)
522	Auto standby select	1:ON 2:OFF	1, 2	1	Set the resolution and con conditions for FAX or cop default settings.
523	Receive equalizer select	1:ON 2:OFF	1,2	2	When the telephone statio from the unit or reception be performed correctly, ac accordingly.
524	SND EQL.	1:ON 2:OFF	1,2	2	When the telephone statio from the unit or reception be performed correctly, ac accordingly.
531	Release PIN code for DIAL LOCK	1:ON 2:YES	1,2	1	When you want to velease code for dial lock, press t key. Then the setting valu to the default.
544	Selecting the document feed position	01~99 step	00~99	50	When the ADF function is incorrect, adjust the feed (8 step = 1mm)
550	Memory clear				Press "START/COPY/SET
551	ROM version and sum check				Press "START/COPY/SET
553	Setting the FAX monitor function	1: OFF 2:PHASE B 3:ALL	1, 2, 3	1	Sets whether to monitor t signal with the unit's spea during FAX communicatio

Code	Function	Set Value	Effective Range	Default	Remarks
554	Modem test				Press "START/COPY/SET"
555	Scanner test				Press "START/COPY/SET"
556	Motor test				Press "START/COPY/SET"
557	LED test				Press "START/COPY/SET"
558	LCD test				Press "START/COPY/SET"
559	Setting the document jam detection	1:ON 2:OFF	1, 2	1	Selects the jam detection document during FAX transmission/copying.
561	KEY test				Press any key.
570	Setting the % break	1:61% 2:67%	1, 2	1	Sets the % break of pulse
571	Setting the number of times that ITS is redialed	00~99	00~99	5 times	Selects the number of tim ITS is redialed (not includi first dial).
572	Setting the ITS redial interval	001~999 sec	001~999	065 sec	Sets the interval of ITS rec
573	Setting of number of rings for REMOTE TURN ON	01~99	01~99	10 times	Sets the number of rings the unit starts to receive a document in the TEL mod
590	Setting the number of FAX redial times	00~99	00~99	05 times	Selects the number of redi during FAX communicatio including the first dial).
591	Setting the FAX redial interval	001~999 sec	001~999	065 sec	Sets the FAX redial interv FAX communication.
592	Designation of CNG sending	1: OFF 2:ALL 3: AUTO	1, 2, 3	2	Lets you select the CNG o during FAX transmission. CNG is output at phase A. CNG is output only when automatic dialing is perfor OFF: CNG is not output at
593	Setting the interval between CED and the 300 bps signal	1: 75 msec 2:500 msec 3:1000 msec	1, 2, 3	1	Sets the interval between signal and subsequent 30 signal. (See "5. Unit can c cannot transmit/receive lo distance or international communications" in DEFE FACSIMILE SECTION ().)

Code	Function	Set Value	Effective Range	Default	Remarks
594	Setting the overseas DIS detection	1: Detects on the 1st time.2: Detects on the 2nd time.	1, 2	1	Sets the recognition forma DIS signal. 1:Detects the fi signal sent from the receiv during FAX transmission. Ignores the first DIS signa from the receiver during F transmission. (See "5. Uni copy, but cannot transmit/ long distance or internatio communications" in DEFE FACSIMILE SECTION ().)
595	Setting an acceptable reception error value	001~999 X number of times	001~999	100	Sets the number of accept error lines when the FAX reconstructs the received
596	Setting the transmit level	- 15~00	- 15~00	- 10 dBm	Selects the FAX transmiss level.
598	Receiving Sensitivity	- 43dBm	20~48	45	(See "5. Unit can copy, bu transmit/receive long dista international communicati DEFECTIVE FACSIMILE SI ().)
717	Transmit speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX transmission.
718	Receive speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX reception.
719	Ringer off in TEL/ FAX mode	1:ON 2:OFF	1, 2	1	Sets the ringer switch off call is received in the TEL/ mode.
721	Pause tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection pauses in dialing.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection after redialing.
731	CPC mode	1:A 2:B 3:OFF	1, 2, 3	1	Set the CPC signal detecti mode from the converter.
763	CNG detect time	1:10 sec 2:20 sec 3:30 sec	1, 2, 3	2	Selects the CNG detection friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets a higher value when t response from the other p needs more time during F transmission.
774	T4 timer	00~99	00~99	00	

Code	Function	Set Value	Effective Range	Default	Remarks
815	Sensor check				Press "START/COPY/SET'
844	Original setting	1:NORMAL 2:LIGHT 3:DARKER	1~3	1	Use this feature when you transmit and copy a docur with very faint writing or v writing. NORMAL: Used for norma LIGHT: Used for faint writi DARKER: Used for dark w This feature will return to t normal mode after transm copying.

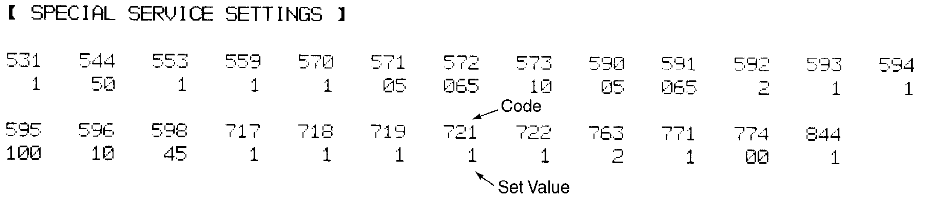
2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)



```
【 SERVICE DATA LIST 】

501 PAUSE TIME          =  050*100ms    [001...600]*100ms
502 FLASH TIME          =  70*10ms      [01...99]*10ms
503 DIAL SPEED          =  10pps        [1=10     2=20]pps
520 CED FREQ.           =  2100Hz       [1=2100   2=1100]Hz
521 INTL. MODE          =  ON           [1=ON     2=OFF]
522 AUTO STANDBY        =  ON           [1=ON     2=OFF]
523 RCV EQL.            =  OFF          [1=ON     2=OFF]
524 SND EQL.            =  OFF          [1=ON     2=OFF]
```

Code
Set Value



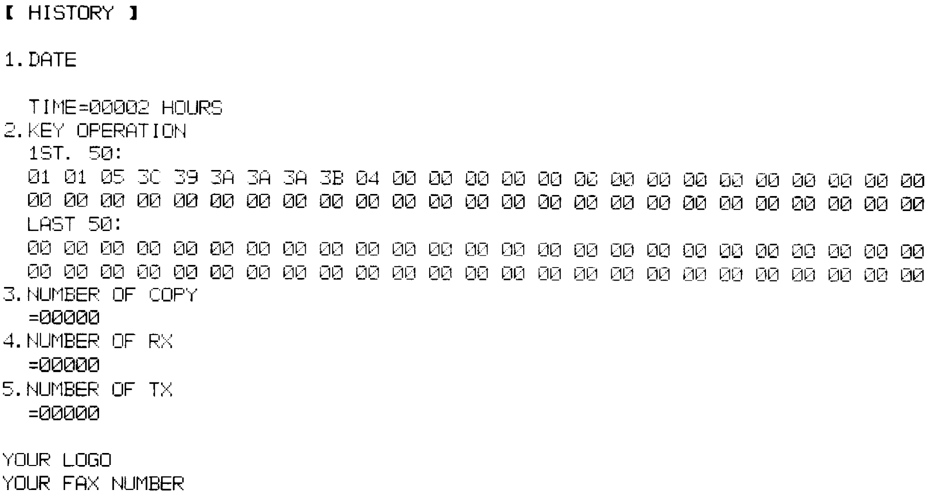
```
【 SPECIAL SERVICE SETTINGS 】

531   544   553   559   570   571   572   573   590   591   592   593   594
  1    50     1     1     1    05   065    10    05   065     2     1     1

595   596   598   717   718   719   721   722   763   771   774   844
100    10    45     1     1     1     1     1     2     1    00     1
```

Code
Set Value

Note:
The above values are the default values.



```
【 HISTORY 】

1.DATE

  TIME=00002 HOURS
2.KEY OPERATION
  1ST. 50:
  01 01 05 3C 39 3A 3A 3A 3B 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  LAST 50:
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
3.NUMBER OF COPY
  =00000
4.NUMBER OF RX
  =00000
5.NUMBER OF TX
  =00000

YOUR LOGO
YOUR FAX NUMBER
```

2.4.6. OTHER

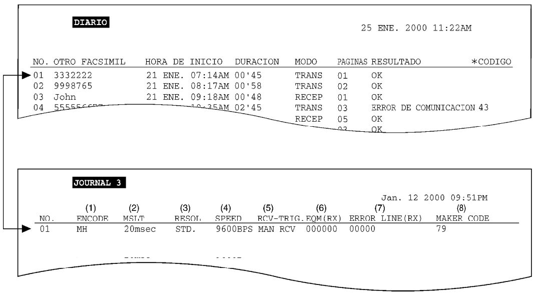
[HISTORY]

No.	Display	Function
1	DATA	Date and time which are set by a user for the first time after purchase. TIME is the expiration from the first power on after purchase.
2	KEY OPERATION	Indicate 2-digit codes. (Refer toBUTTON CODE TABLE ()). 1st.50: History of the key operation from 1st to 50th after purchase. Last.50: History of the last 50 key operations.
3	NUMBER of COPY	The number of pages copied..
4	NUMBER of RX	The number of pages received.
5	NUMBER of TX	The number of pages sent.

2.4.7. SPECIAL SERVICE JOURNAL REPORTS

Example:

Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 882. Remote printing function for the journal reports (JOURNAL and JOURNAL 3) is also available for service technicians. (Refer to REMOTE PROGRAMMING ().) The JOURNAL report only gives you basic information about a communication, but the JOURNAL 3 report provide different information on the same item (communication).



```
DIARIO
                                                25 ENE. 2000 11:22AM

NO. OTRO FACSIMIL     HORA DE INICIO  DURACION   MODO    PAGINAS RESULTADO              *CODIGO
01  3332222           21 ENE. 07:14AM 00'45      TRANS   01      OK
02  9998765           21 ENE. 08:17AM 00'58      TRANS   02      OK
03  John              21 ENE. 09:18AM 00'48      RECEP   01      OK
04  55555                     10:35AM 02'45      TRANS   03      ERROR DE COMUNICACION 43
                                                 RECEP   05      OK
                                                                 OK

JOURNAL 3
                                                          Jan. 12 2000 09:51PM
         (1)      (2)       (3)      (4)      (5)           (6)        (7)             (8)
NO.     ENCODE   MSLT      RESOL.   SPEED    RCV-TRIG.EQM(RX)  ERROR LINE(RX)   MAKER CODE
01      MH       20msec    STD.     9600BPS  MAN RCV  000000   00000            79
```

HOW TO READ JOURNAL REPORTS:

1. **Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 3. You can get the following information.**
   *** MODE: Fax transmission / * TX SPEED: 9.6 kbps / * RESOLUTION : standard / * ENCODE: MH / * MAKER CODE: 79**

For further details, see JOURNAL 3 ().

2.4.7.1. JOURNAL 3

Descriptions:

1. **ENCODE**
   Compression Code: MH/MR
2. **MSLT**

MSLT means Minimum Scan Line Time. Used only at the factory.

3. RESOLUTION (RESOL)

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, “?” is displayed.

4. SPEED

Indicates the speed of communication. If multiple pages are transmitted or received, it indicates the last page´s communication speed. If there is a communication error, “?” is displayed.

5. RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 3 in 2.4.7.2. PRINTOUT EXAMPLE. The values in parentheses indicate how many times the trigger has been used. (For example, “0003” means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
5	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a paralle connected telephone.
6	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
7	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FA mode.
8	IDENT	Means the unit detected Ring Detection.
9	TEL/FAX	Means the unit detected the CNN while it was sending the Dummy Ring Back To in the TEL/FAX mode.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The “NO RESPONSE DISAPPEARED ON JOURNAL” displays the information about the last 10 communications terminated by “No Response”. (Some of the communications terminated by “No Response” were not displayed in the JOURNAL.)When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, “No response” will be printed.

6. EQM

EQM means Eye Quality Monitor. Used only at the factory.

7. ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of error lines.

8. MAKER CODE

This shows a 2 digit code of the other partyís fax machine brand. 0E: “KX” model / 00: Unknown / 79: “UF” model / 19: “Xerox” model

2.4.7.2. PRINTOUT EXAMPLE

```
        [ JOURNAL3 ]

                                                            01 ENE. 1999 12:04AM

 NO.   ENCODE  MSLT     RESOL    SPEED    RCV-TRIG.  EQM(RX) ERROR LINE(RX)   MAKER CODE
 01    MR      20msec   STD.     9600BPS  ?          000000  00000            0E
```

2.5. TEST FUNCTIONS

Test Mode	Type of Mode	Code	Function
		Operation after code input	
PRINT TEST	Service Mode	“8” “5”	Prints a test pattem and checks the thermal head abnormalities (missing dots, etc), and also check operation of the reception motor.(Refer to JOURN
		START	
MOTOR TEST	Service Mode	“5” “5” “6”	Rotates the transmission and reception motors tc the operation of the motors. 0.....Stop 1.....Turn forward TX roller at 400pps 2-2 phase 2.....Turn forward TX roller at 400pps 1-2 phase 3.....Turn forward RX roller at 400pps 2-2 phase 4.....Turn forward RX roller at 400pps 1-2 phase 5.....Turn forward TX/RX roller at 400pps 1-2 phas 6.....Reverse the motor at 400pps 1-2 phase 7.....Set the cam gear to the home position 8.....Set the cam gear to the RX mode 9.....Set the cam gear to the copy mode press the STOP button to cansel.
		START	
MODEM TEST	Service Mode	“5” “5” “4”	Sends four kinds of FAX signals to check the sen function of the modem. / 1)1100 Hz: Consecutive EOM for tonal / 2)2100 Hz: G2 carrier signal / Co of CED signal / 3)G3,V29 training signal [modulati of carrier signal (1700 Hz)]
		START	
ROM CHECK	Service Mode	“5” “5” “1”	Indicates the version and checks the sum of the F
		START	

Test Mode	Type of Mode	Code Operation after code input	Function
SCAN CHECK	**Service Mode**	**“5” “5” “5”** **START**	**Tums on the LEDs of the image sensor and opera read systems.**
LCD CHECK	**Service Mode**	**“5” “5” “8”** **START**	**Checks the LCD indication.Illuminates all the dots if they are normal.**
DTMF SINGLE TEST	**Service Mode**	**“5” “5” “2”** **1....ON** **2....OFF**	**Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer t SINGLE TONE TRANSMIT SELECTION ().**
KEY CHECK	**Service Mode**	**“5” “6” “1”** **START (any key)**	**Checks the button operation.** **Indicates the button code on the LCD while the b pressed. Refer to BUTTON CODE TABLE ().**
FACTORY SET	**Service Mode**	**“5” “5” “0”** **START**	**Clears the memory where the users can store dat**
SENSOR CHECK & VOX CHECK	**Service Mode**	**“8” “1” “5”** **START**	**CHECKS THE SENSOR OPERATION** **After entering this mode, perform the copy operat** **For each sensor’s operation, refer to SENSORS A SWITCHES().** **[Do Sn Pa] : LCD DISPLAY** **Do: Document set sensor** **:Paper inserted. Turns on when a document is ins** **Sn: Read position sensor.** **:At the read position, turns on when the front cov opened and the sensor lever is pressed directory.** **Pa: Recording Paper Sensor** **:Set Recording Paper. Turns on and off when the lock lever is pushed down and up.**

2.5.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	key	Low Frequency (Hz)
“1”	697	“5”	1209
“2”	770	“6”	1336
“3”	852	“7”	1477
“4”	941	“8”	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) Low (Hz)	1209	1336	1477
697	“1”	“2”	“3”
770	“4”	“5”	“6”
852	“7”	“8”	“9”
941	“*”	“0”	“#”

Note:

After performing this check, do not forget to turn the setting off. Otherwise, dialing in DTMF signal will not work.

2.5.2. BUTTON CODE TABLE

Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	31	1	87	STATION 1
03	MODE RECEIVE	32	2	88	STATION 2
04	START/COPY/SET	33	3	89	STATION 3
05	MEMU	34	4	3A	0
07	HELP	35	5	3B	*
08	MONITOR	36	6	3C	#
0B	LOWER	37	7	3D	REDIAL/PAUSE
0C	DIRECTORY	38	8	3E	FLASH
0D	⊞ VOLUME	39	9	00	NO INPUT
0E	⊟ VOLUME	38		01	STOP

Note:
These codes (00, 01) are only for the data in the History Report.

2.5.3. PRINT TEST PATTERN

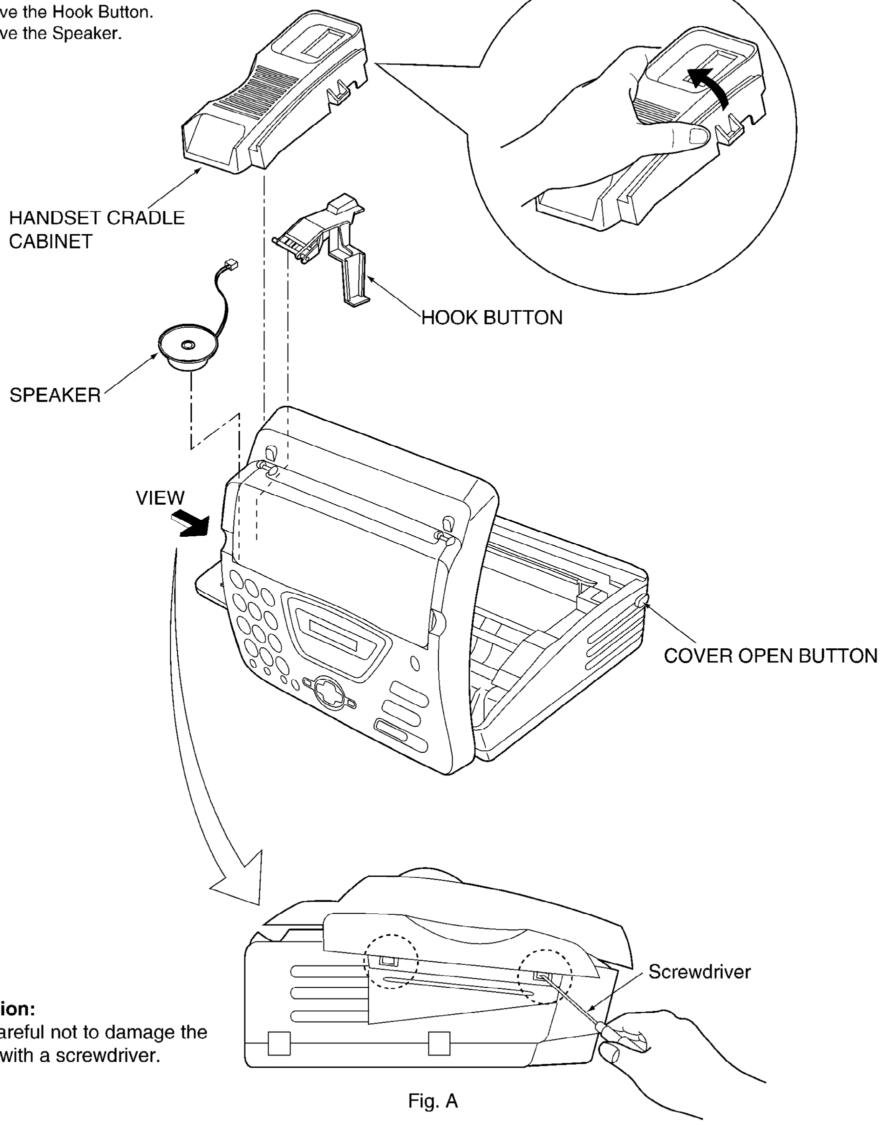
3. DISASSEMBLY INSTRUCTIONS

3.1. HOW TO REMOVE THE HANDSET CRADLE CABINET, HOOK BUTTON AND SPEAKER

Procedure: 1

REF No. 1

1) Push the cover open button.
2) Push the tabs with a screwdriver. (See Fig.A.)
3) Remove the Handset Cradle Cabinet.
4) Remove the Hook Button.
5) Remove the Speaker.


HANDSET CRADLE CABINET
HOOK BUTTON
SPEAKER
VIEW
COVER OPEN BUTTON
Screwdriver

Caution:
Be careful not to damage the tabs with a screwdriver.

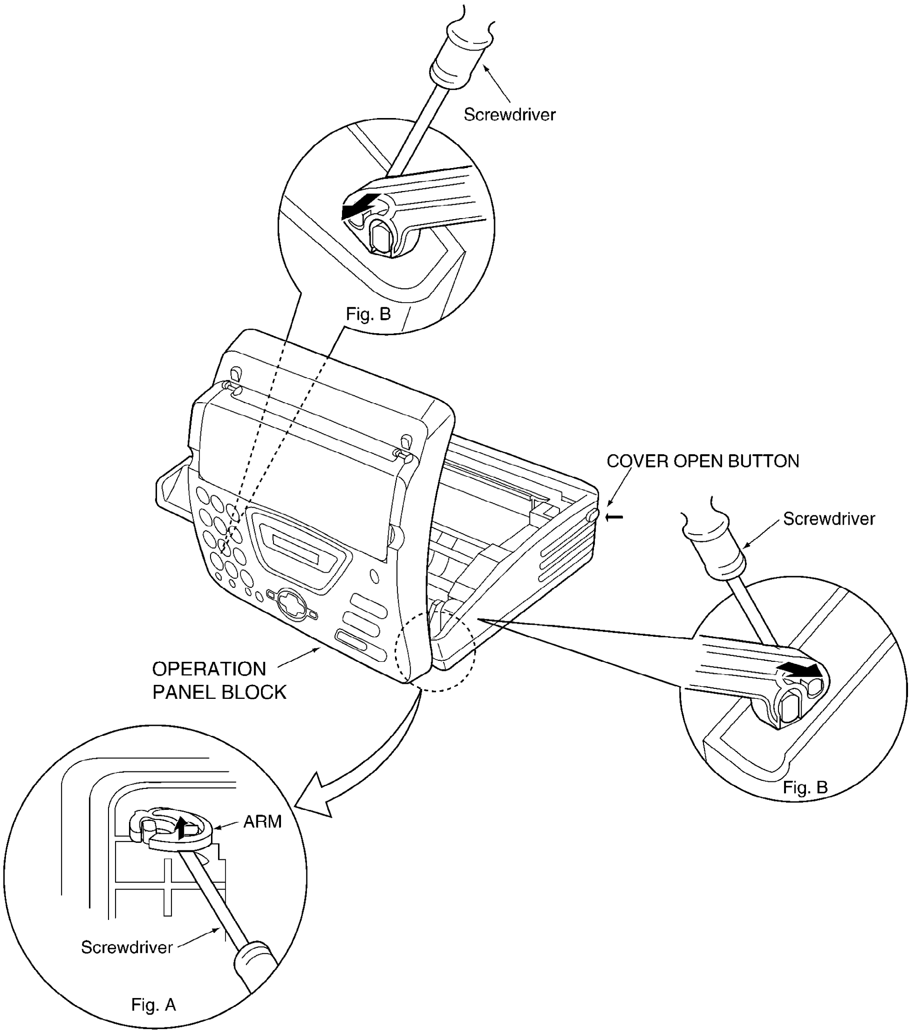
Fig. A

3.2. HOW TO REMOVE THE OPERATION BLOCK

Procedure: 2

REF No. 2

1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK .
2) Push the cover open button in the direction of the arrow to open the operation block.
3) Tilt the unit vertically so that its left side faces down the grey-shaded ARM as illustrated in Fig. A, insert a screwdriver and unlatch the ARM as illustrated in Fig. A.
4) Pull out both sides of the arms in the direction of the arrow shown in Fig. B.
5) Remove the OPERATION PANEL BLOCK.

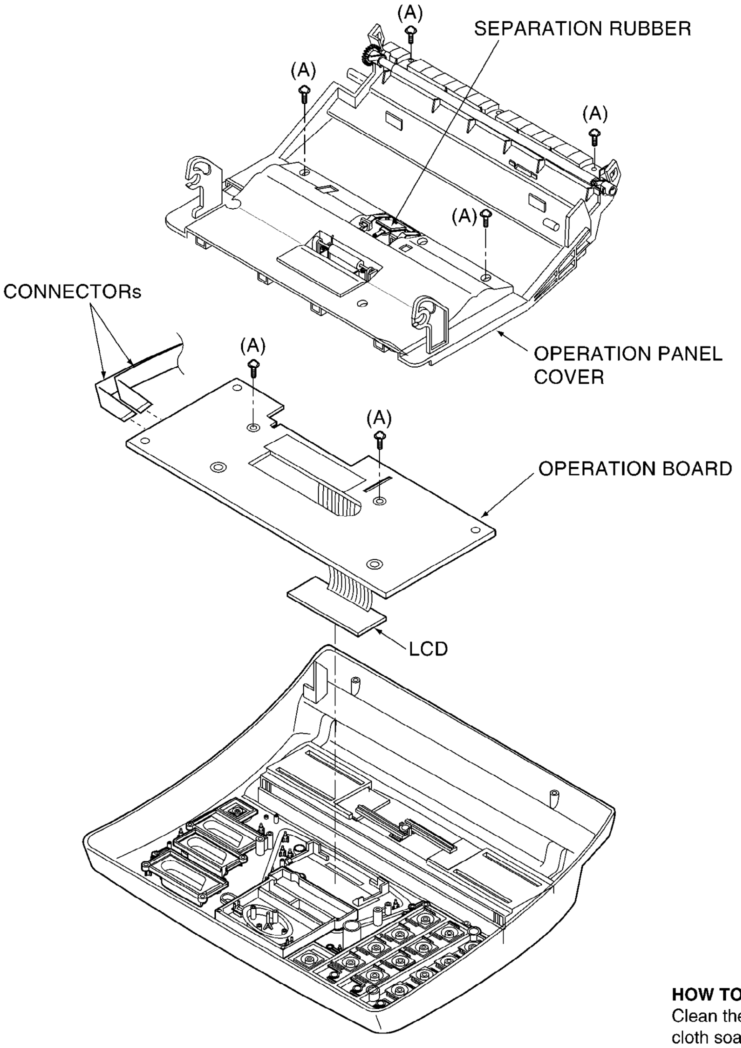

Screwdriver
Fig. B
COVER OPEN BUTTON
Screwdriver
OPERATION
PANEL BLOCK
Fig. B
ARM
Screwdriver
Fig. A

3.3. HOW TO REMOVE THE OPERATION BOARD AND LCD

Procedure: 2→3

REF No. 3

1) Remove the 4 screws (A) and the Operation Panel Cover.
2) Remove the 2 screws (A) on the Operation Board and LCD.
3) Remove the Operation Board.
4) Remove the connectors.


(A)
SEPARATION RUBBER
(A)
(A)
(A)
CONNECTORs
(A)
OPERATION PANEL COVER
(A)
OPERATION BOARD
LCD

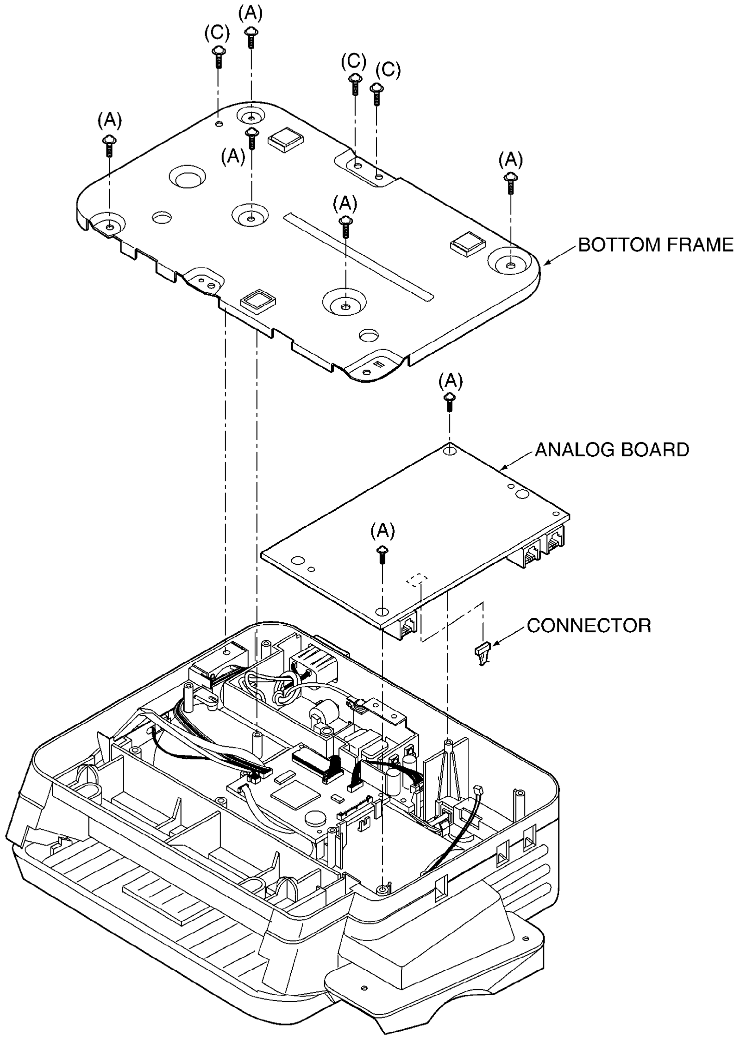
HOW TO CLEAN:
Clean the roller with a cloth soaked in alcohol.

3.4. HOW TO REMOVE THE BOTTOM FRAME AND ANALOG BOARD

Procedure: 4

REF No. 4

1) Remove the 5 screws (A) and 3 screws (C) on the Bottom Frame.
2) Remove the Bottom Frame.
3) Remove the 2 screws (A) on the Analog Board.
4) Remove the connector.
5) Remove the Analog Board.



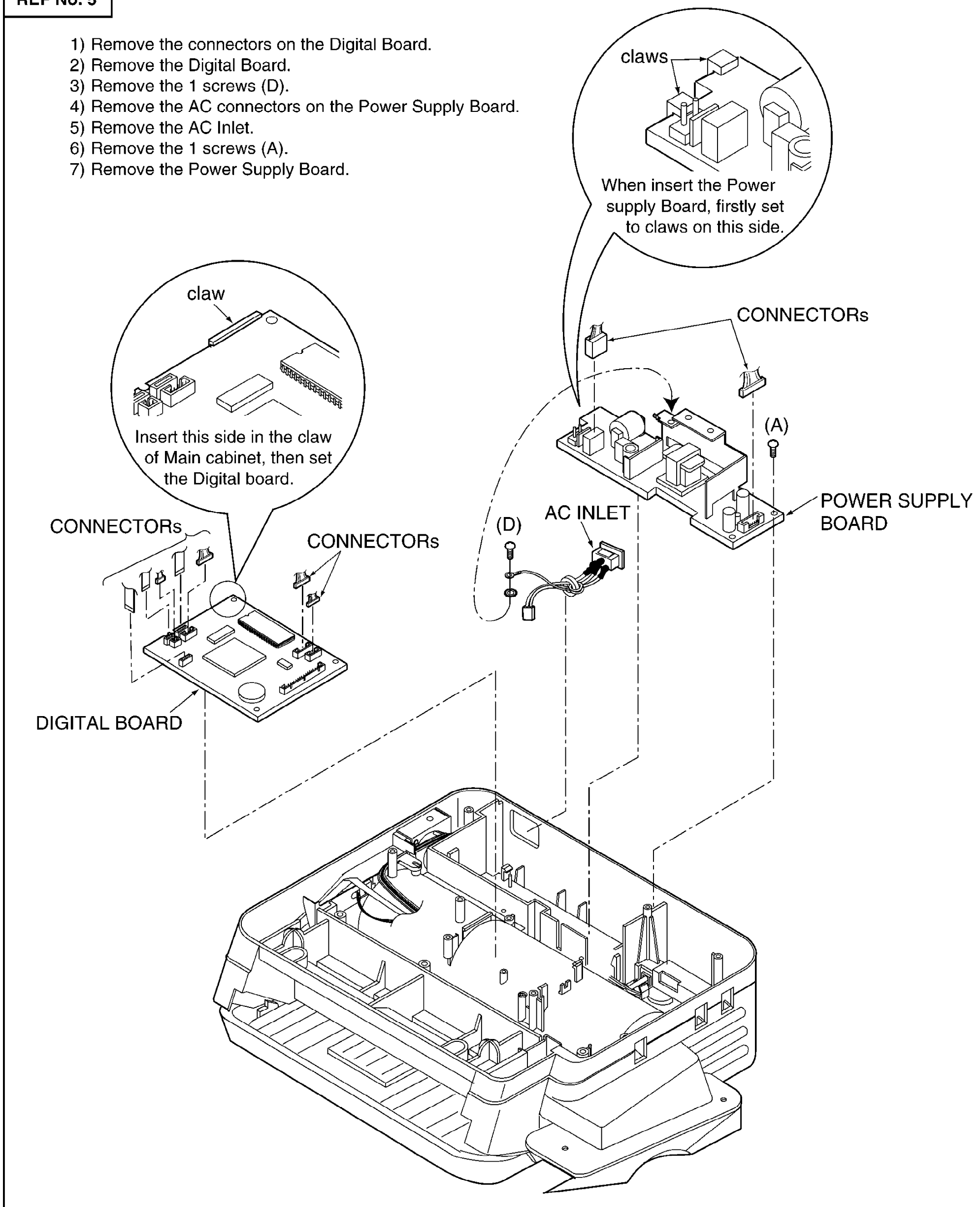
(A)
(C)
(C)
(C)
(A)
(A)
(A)
(A)
BOTTOM FRAME
(A)
ANALOG BOARD
(A)
CONNECTOR

3.5. HOW TO REMOVE THE DIGITAL, POWER SUPPLY BOARD AND AC INLET

Procedure: 4→5

REF No. 5

1) Remove the connectors on the Digital Board.
2) Remove the Digital Board.
3) Remove the 1 screws (D).
4) Remove the AC connectors on the Power Supply Board.
5) Remove the AC Inlet.
6) Remove the 1 screws (A).
7) Remove the Power Supply Board.

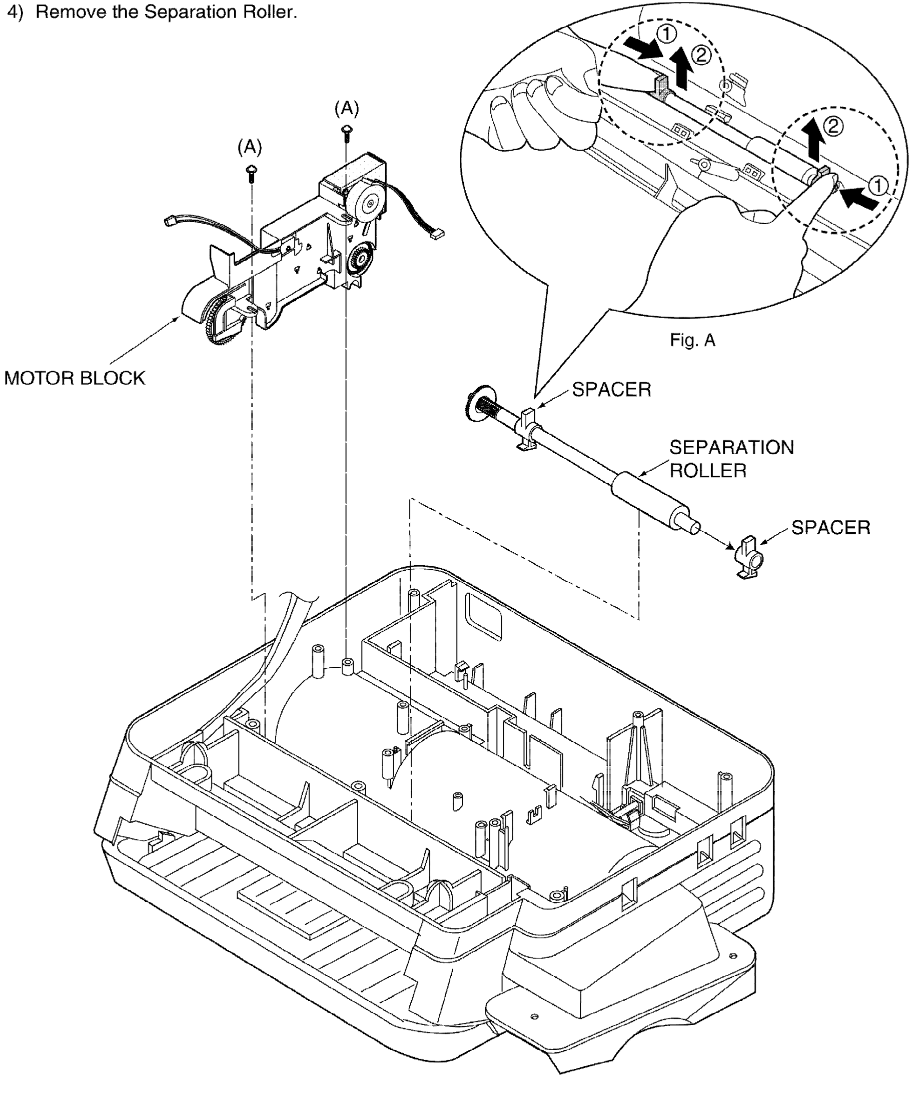

claws
When insert the Power supply Board, firstly set to claws on this side.
claw
Insert this side in the claw of Main cabinet, then set the Digital board.
CONNECTORs
CONNECTORs
CONNECTORs
(A)
POWER SUPPLY BOARD
AC INLET
(D)
DIGITAL BOARD

3.6. HOW □@TO REMOVE THE MOTOR BLOCK AND SEPARATION ROLLER

Procedure: 4→5→6

REF No. 6

1) Remove the 2 screw (A).
2) Remove the MOTOR BLOCK.
3) Unlock the Spacers as shown in Fig. A.
4) Remove the Separation Roller.

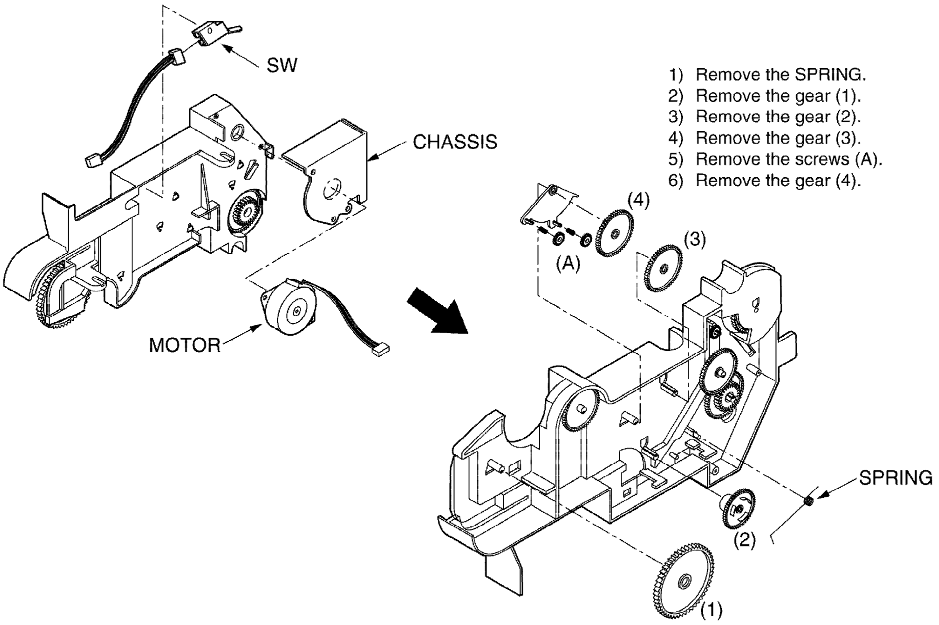

①
②
②
①
Fig. A
(A)
(A)
MOTOR BLOCK
SPACER
SEPARATION ROLLER
SPACER

3.7. HOW TO REMOVE THE MOTOR AND GEARS OF MOTOR BLOCK

Procedure: 4→5→6→7

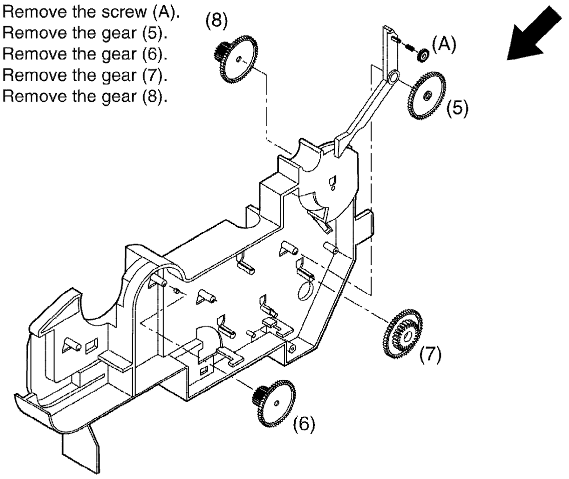
REF No. 7

1) Remove the SW.
2) Remove the MOTOR.
3) Remove the CHASSIS.


SW
CHASSIS
MOTOR
(4)
(3)
(A)
SPRING
(2)
(1)

1) Remove the SPRING.
2) Remove the gear (1).
3) Remove the gear (2).
4) Remove the gear (3).
5) Remove the screws (A).
6) Remove the gear (4).

1) Remove the screw (A).
2) Remove the gear (5).
3) Remove the gear (6).
4) Remove the gear (7).
5) Remove the gear (8).



3.8. HOW TO REMOVE THE IMAGE SENSOR (CIS)

Procedure: 2→8

REF No. 8

1) Remove the Sheet as shown in Fig. A.
2) Remove the Image Sensor (CIS) as shown in Fig. B.

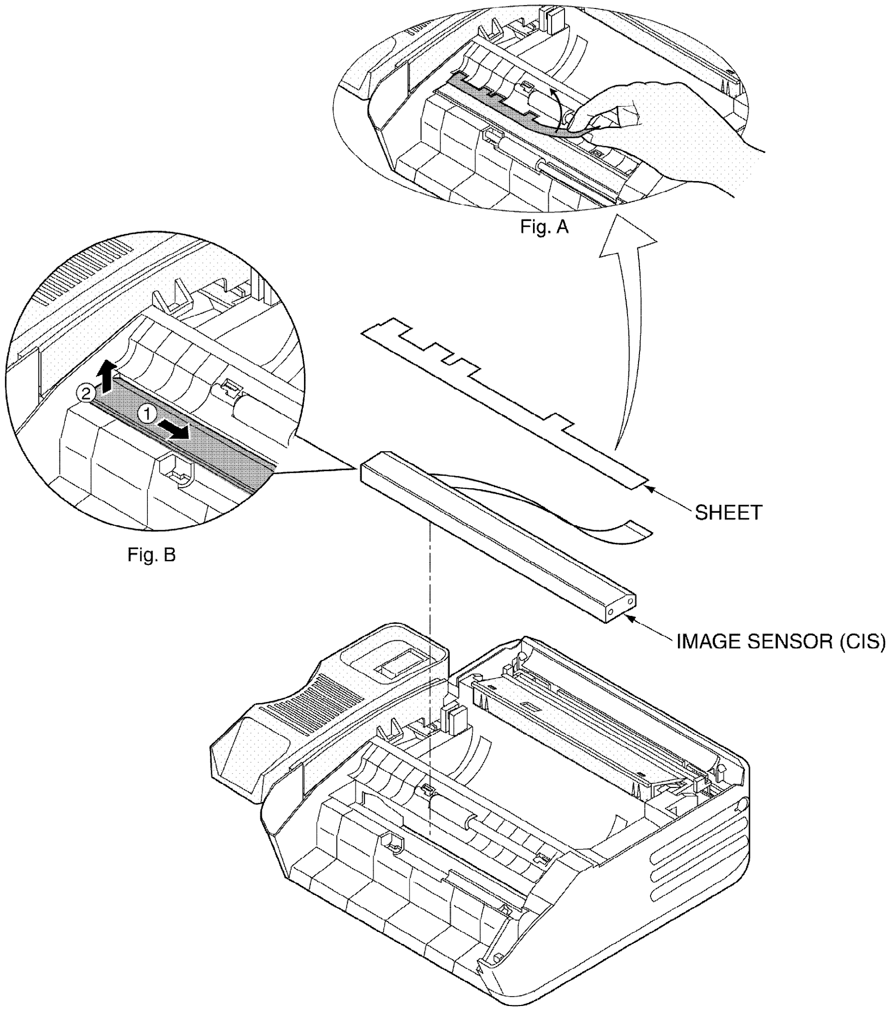


Fig. A
Fig. B
②
①
SHEET
IMAGE SENSOR (CIS)

3.9. HOW TO REMOVE THE DOCUMENT FEED ROLLER

Procedure: 2→9

REF No. 9

1) Unhook the Spring as shown in Fig. B.
2) Unrock the Spacers as shown in Fig. A.
3) Remove the Document Feed Roller.

Note:

When insert the document Feed Roller, hook the Spring to the shaft.

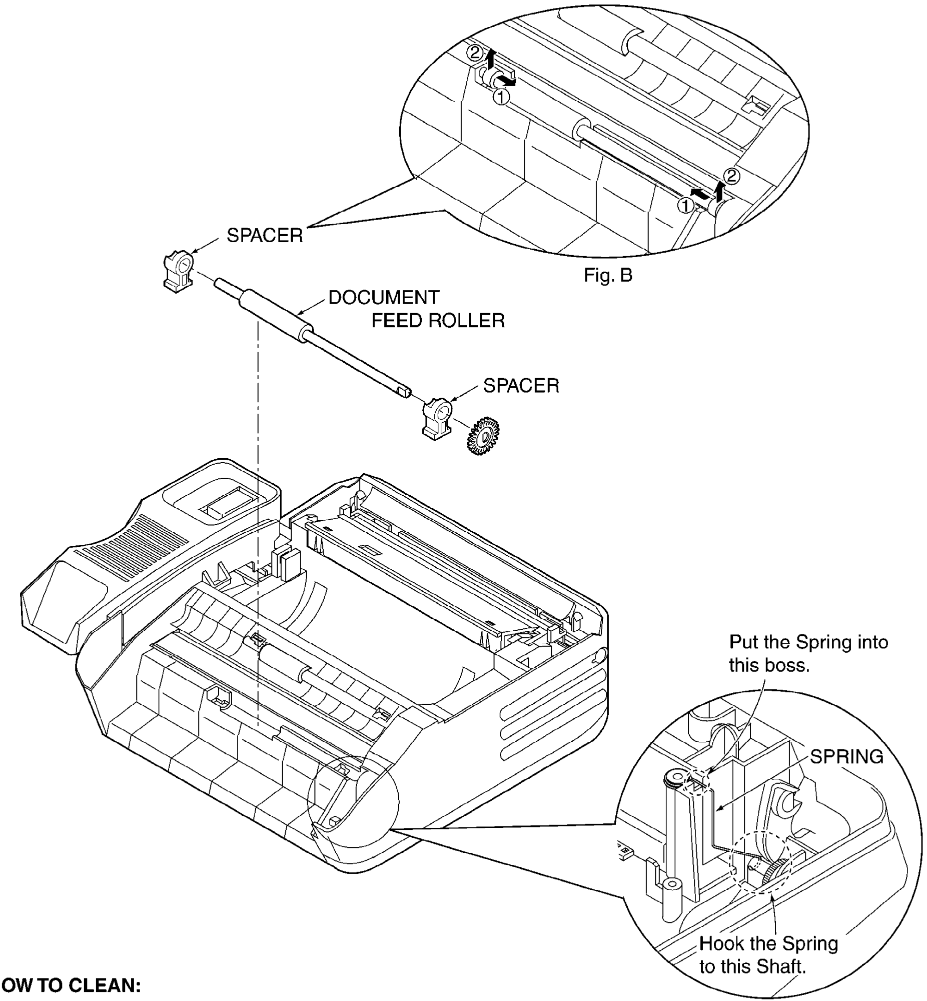

②
①
②
①
SPACER
DOCUMENT FEED ROLLER
SPACER
Put the Spring into this boss.
SPRING
Hook the Spring to this Shaft.

Fig. B

Fig. A
(Bottom view)

HOW TO CLEAN:
Clean the roller with a cloth soaked in alcohol.

3.10. HOW TO REMOVE THE THERMAL HEAD

Procedure: 10

REF No. 10

1) Push the cover open button in the direction of the arrow to open the operation block.
2) Remove the Head Cover with a screwdriver as shown in Fig. A.
3) Remove the 2 connector.
4) Remove the Thermal Head as shown in Fig. B.
5) Remove the lock lever as shown in Fig. C.

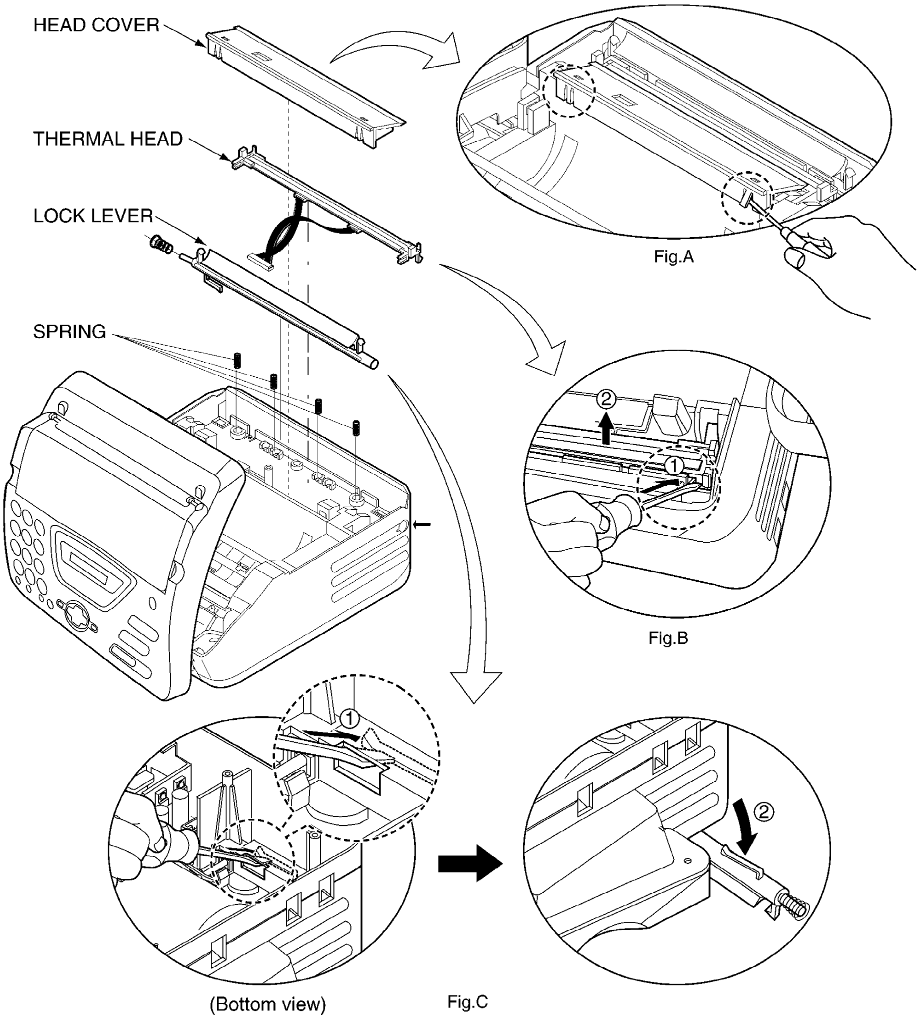
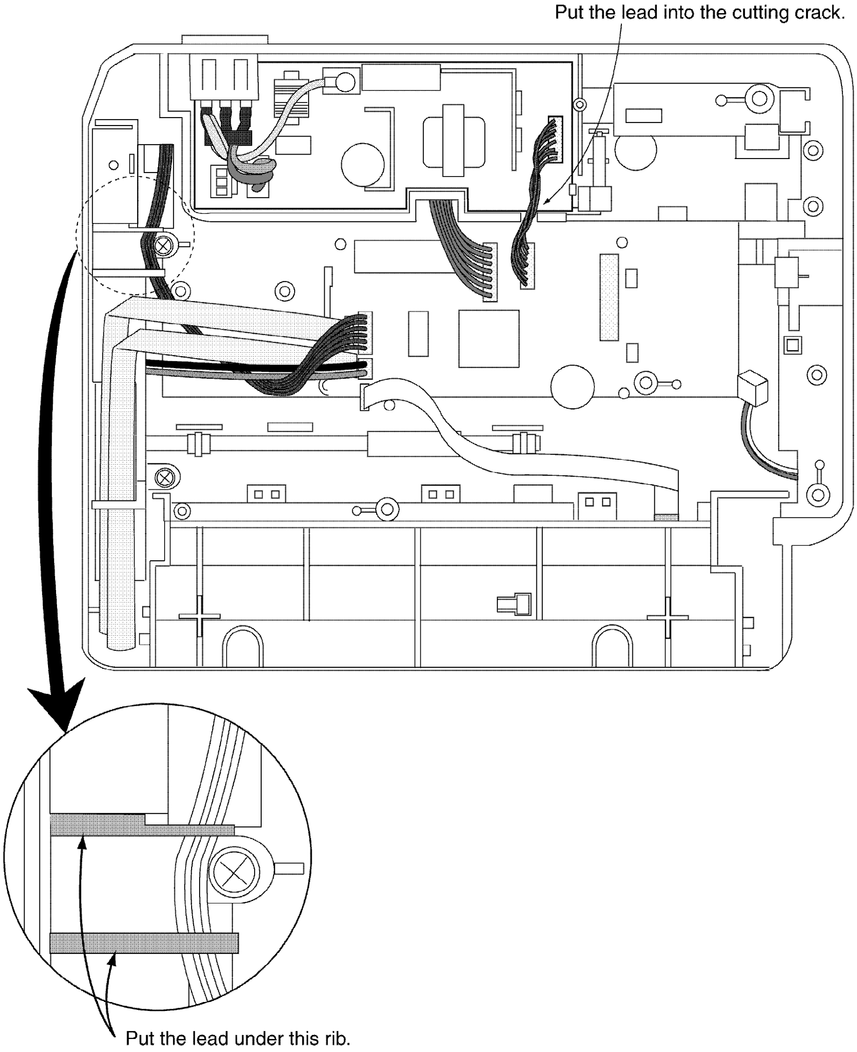

HEAD COVER
THERMAL HEAD
LOCK LEVER
SPRING
②
①
①
②
(Bottom view)

Fig.A

Fig.B

Fig.C

3.11. INSTALLATION POSITION OF THE LEAD WIRES


Put the lead into the cutting crack.
Put the lead under this rib.

4. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount), a soldering iron, and a cutter knife, you can easily remove the ICs even if there are more than 100 pins.

4.1. PREPARATION

- **SOLDER**
  Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA
- **Soldering iron**

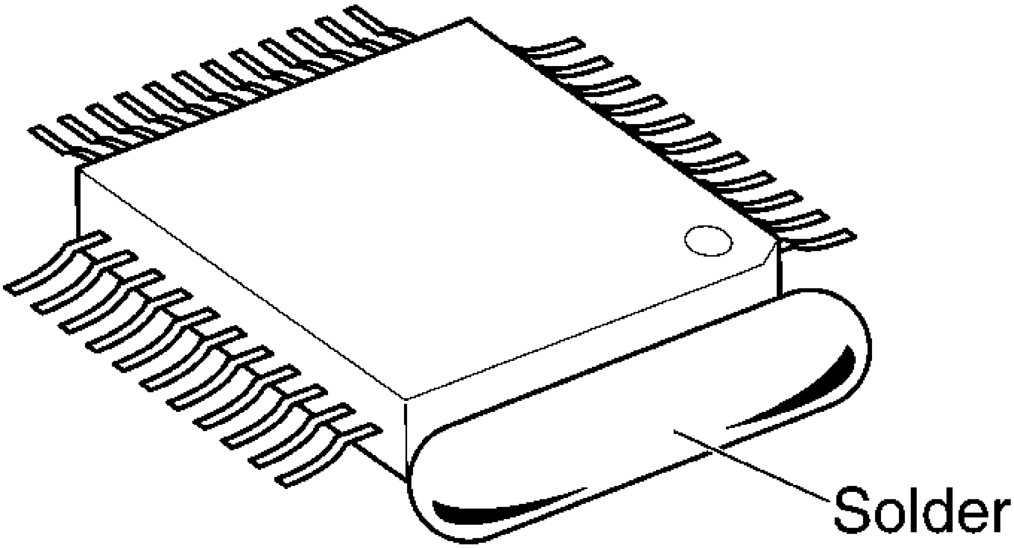
Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod 662 ± 50°F (350 ± 10°C) / (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

- **Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)**

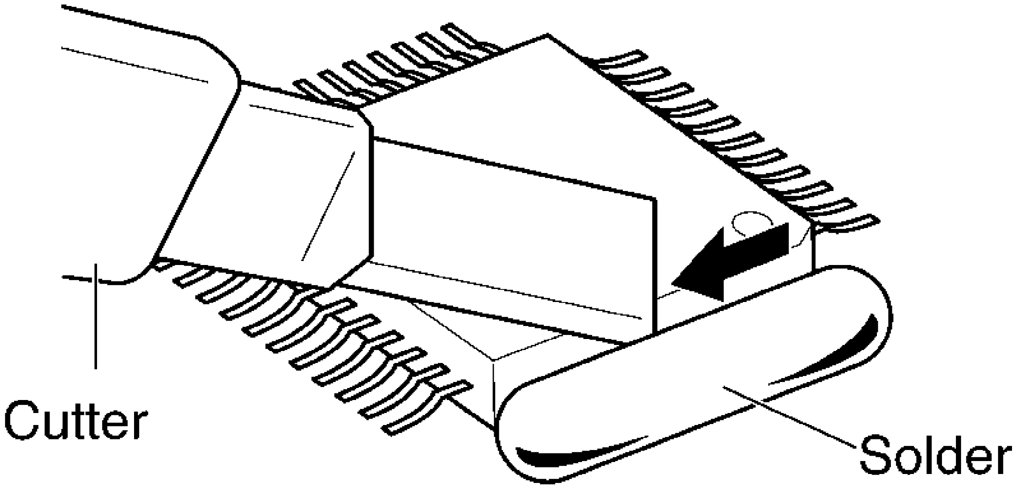
4.2. FLAT PACKAGE IC REMOVAL PROCEDURE

1. When all of the IC lead cannot been seen at the standard degree, fill with large quantities of solder.

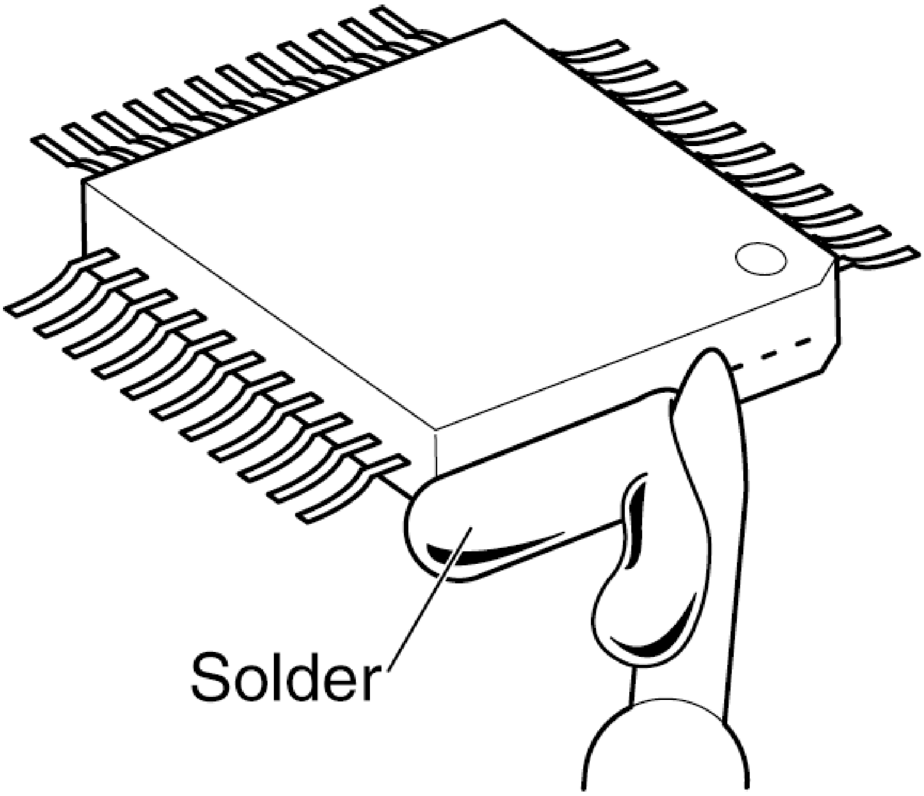
Note:
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C. board's pattern. If you do not fill with large quantities of solder as in step 1, the P.C. board pattern may be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with a cutter lightly, 5 or 6 times.)



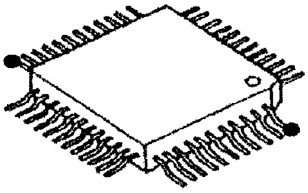
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching a new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly

4.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

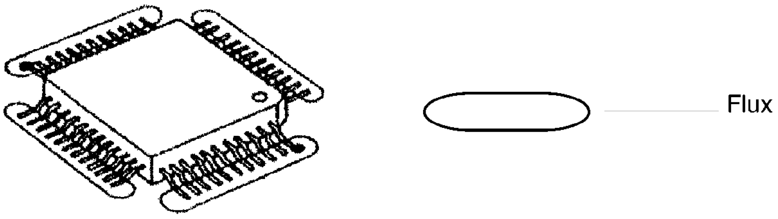
1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.



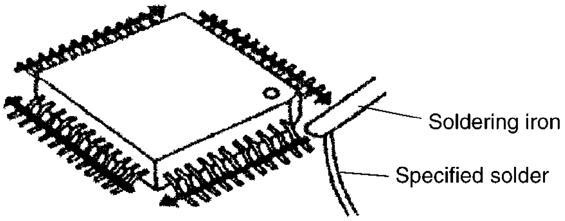
● Temporary soldering point.

*Check the accuracy of the IC setting with the corresponding soldering foil.

2) Apply flux to all pins of the FLAT PACKAGE IC.



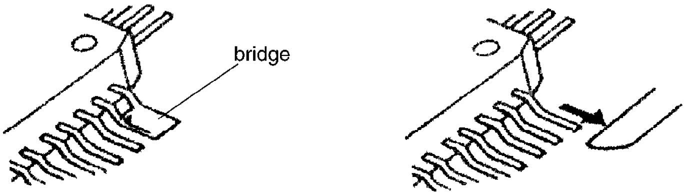
3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



4.4. BRIDGE MODIFICATION PROCEDURE

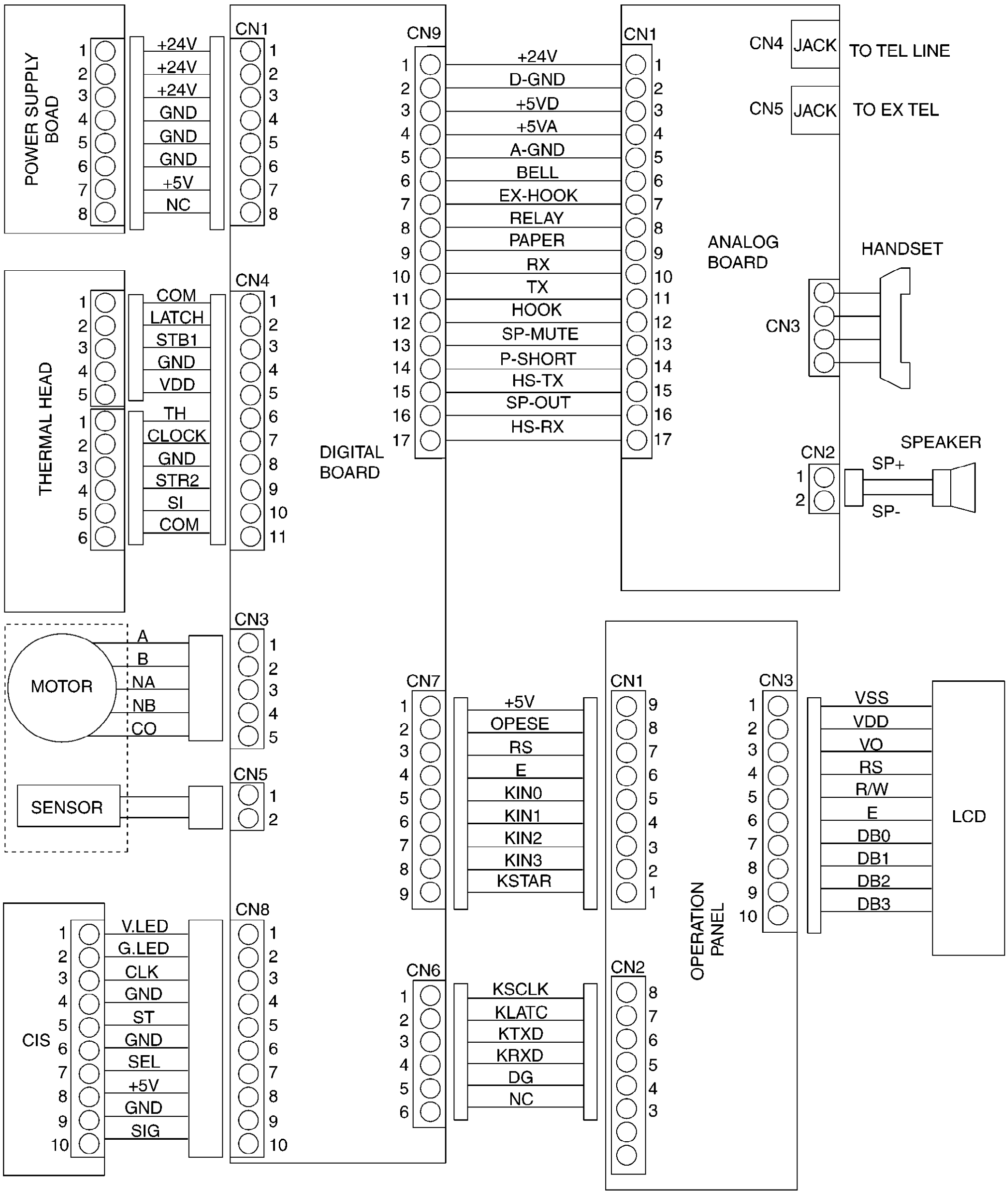
1) Lightly re-solder the bridged portion.

2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



5. CIRCUIT OPERATIONS

5.1. CONNECTION DIAGRAM


POWER SUPPLY BOAD
+24V
+24V
+24V
GND
GND
GND
+5V
NC
CN1
DIGITAL BOARD
CN9
+24V
D-GND
+5VD
+5VA
A-GND
BELL
EX-HOOK
RELAY
PAPER
RX
TX
HOOK
SP-MUTE
P-SHORT
HS-TX
SP-OUT
HS-RX
CN1
ANALOG BOARD
CN4
JACK
TO TEL LINE
CN5
JACK
TO EX TEL
HANDSET
CN3
CN2
SPEAKER
SP+
SP-
THERMAL HEAD
COM
LATCH
STB1
GND
VDD
TH
CLOCK
GND
STR2
SI
COM
CN4
MOTOR
A
B
NA
NB
CO
CN3
SENSOR
CN5
CN7
+5V
OPESE
RS
E
KIN0
KIN1
KIN2
KIN3
KSTAR
CN1
OPERATION PANEL
CN3
VSS
VDD
VO
RS
R/W
E
DB0
DB1
DB2
DB3
LCD
CIS
V.LED
G.LED
CLK
GND
ST
GND
SEL
+5V
GND
SIG
CN8
CN6
KSCLK
KLATC
KTXD
KRXD
DG
NC
CN2

5.2. GENERAL BLOCK DIAGRAM

The control section will be explained as shown in the block diagram.

1. ASIC (IC1)

Composed mainly of an address decoder, modem control section, CPU and RTC.

Controls the general FAX operations.

Controls the operation panel I/F.

Controls the thermal head I/F and CIS I/F.

Executes image processing.

Monitors the H/S volume.

I/O ports

2. ROM (IC2)

Contains all of the program instructions for unit operations.

3. Static RAM (IC3)

This memory is used mainly for the parameter working storage area.

4. MODEM (Incruded in IC1)

Modem for the FAX.

5. Read Section

Contact Image Sensor (CIS) to read transmitting documents.

6. Thermal Head

Contains heating elements for dot matrix image printing.

7. Motor driver (IC7)

Drives the motor.

8. Reset circuit (IC4)

Provides a reset pulse to each of the major ICs.

9. Analog board

Composed of an ITS circuit and NCU circuit.

10. Sensor Section

Composed of a document sensor, recording paper sensor, motor position sensors, read position sensor.

11. Power supply switching board section

Supplies +5V and +24V to the unit.

12. CODEC (IC5)

A/D and D/A converter.

5.2.1. General Block Diagram

5.3. CONTROL SECTION

5.3.1. BLOCK DIAGRAM

5.3.2. ASIC (IC1)

This custom IC is used for general FAX operations.

1. CPU

This model uses a Z80 equivalent CPU operating at 8MHz. / Many of the peripheral functions are handled by custom designed LSIS.

As a result, the CPU only needs to process the result.

2. RTC

   Real time clock.

3. DECODER

   Decodes the address.

4. MODEM

   Execute modulation and demodulation for the FAX.

5. ROM/RAM I/F

   Controls the SELECT signal of ROM or RAM and bank switching.

6. CIS I/F

   Controls document reading.

7. IMAGE DATA RAM

   This is inside the ASIC and has 8KB which is used for image processing.

8. THERMAL HEAD I/F

   Transmits the recorded data to the thermal head.

9. MOTOR I/F

   Controls the motor which feeds the document and feeds the reading document.

10. OPERATION PANEL I/F

    Serial interface with Operation Panel.

11. I/O PORT

    I/O Port Interface (for analog board port control).

12. ANALOG UNIT

    Electronic volume for the handset and monitor. / Sends beep tones, etc.

Explanation of the Pin Distribution (IC1)

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
1	X32OUT	VDDRTC	-	X32OUT		32.768kHz oscillator for RTC (b feed back resistor)
2	X32IN	VDDRTC	NO	X32IN		32.768kHz oscillator for RTC (b feed back resistor)
3	VDDRTC			+3.3V/ BATT		32.768kHz backup power suppl
4	XBACKEN	VDDRTC	YES	XRESET		Backup enable
5	VDDSRAM			+3.3V/ BATT		RAMCS buffer/backup power s reset
6	XRAMCS	VDDSRAM	-	VDDSRAM		SRAM chip select ("H": 3.3V or
7	XRAMCE2/ ALARM	VDDSRAM	-	OPEN		Not used
8	FTG	MULT3/5	NO	FTG	O	FTG
9	F1	MULT3/5	NO	F1	O	F1 (50%/75% selector)
10	MULT3/5			+5V		Power supply
11	VSS			DG		Ground
12	F2/OP50	MULT3/5	NO	E	O	LCD control
13	FR/OP51	MULT3/5	NO	OPEN	O	Not used
14	XRESET	3.3V	YES	XRESET		Reset input for internal digital
15	VSS			DG		Ground
16	XORESET	3.3V	-	XORESET		Reset output
17	XRESETI	3.3V	YES	XRESETI		Voltage detector IC output for
18	XWDERR	3.3V	YES	XWDERR		Watch dog timer error
19	XRSTSWO/ OP82	3.3V	YES	OPEN	O	Not used
20	VIDRST/IOP20	3.3V	YES	OPEN	O	Not used
21	SPHCLK/IOP21	3.3V	YES	OPEN	O	Not used
22	DARKON/IOP22	3.3V	YES	OPEN	O	Not used
23	ADSEL2/IOP23	3.3V	YES	OPEN	O	Not used
24	BELL/OP	3.3V	YES	OPEN	O	Not used
25	3.3V			+3.3V		Power supply
26	IRDATXD/IOP81	3.3V	YES	OPEN	O	Not used
27	IRDARXD/ IOP80	3.3V	YES	OPEN	O	Not used
28	TXD/IOP30	3.3V	YES	BREAK	O	TEL Line Break Control
29	RXD/IOP31	3.3V	YES	H/S ALC	I	Not used (Hardware Control)
30	XRTS/IOP32	3.3V	YES	DTMF IMP	O	DTMF-IMP Control
31	XCTS/IOP33	3.3V	YES	P-SHORT	O	P-SHORT Control (Not Used)
32	XDSR/IOP34	3.3V	YES	OPEN	O	Not used
33	DCD/IOP35	3.3V	YES	OPEN	O	Not used
34	XDTR/IOP36	3.3V	YES	OPEN	O	Not used
35	RI/CLK/IOP37	3.3V	YES	OPEN	O	Not used
36	IOP90	3.3V	YES	OPEN	O	Not used
37	IOP91	3.3V	YES	OPEN	O	Not used
38	VSS			DG		Ground

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
39	IOP92	3.3V	YES	OPEN	O	Not used
40	IOP93	3.3V	YES	OPEN	O	Not used
41	IOP94	3.3V	YES	OPEN	O	Not used
42	IOP95	3.3V	YES	OPEN	O	Not used
43	3.3V			+3.3V		Power supply
44	FMEMCS/IOP27	3.3V	YES	OPEN	O	Not used
45	FMEMDO/IOP26	3.3V	YES		I	Not used
46	FMEMDI/IOP25	3.3V	YES		O	Not used
47	FMEMCLK/ IOP24	3.3V	YES	TELRXENB	I/O	Telephone RX root control
48	CBUSY2	3.3V	-	OPEN		Not used
49	CSO/OP70	3.3V	-	OPEN		Not used
50	CBUSY1	3.3V	YES	OPEN		Not used
51	CCLK	3.3V	YES	OPEN		Not used
52	CSI	3.3V	YES	OPEN		Not used
53	MIDAT/IOP45	MULT3/5	YES	MTXENB	O	Modem TX route control
54	MICLK/IOP46	MULT3/5	YES	MOMRXENB	O	Modem RX route control
55	MILAT/IOP47	MULT3/5	YES	H/SRXENB	O	Handset RX route control
56	RVN	3.3V	YES	BELL		Bell signal detection
57	CPC	3.3V	YES	PAPER		Recording paper detection
58	TONE1	3.3V	-	TONE1		Not used
59	TONE2	3.3V	-	TONE2		Tone2 (bell alarm key tone)
60	VSS			DG		Ground
61	3.3V			+3.3V		Power supply
62	EVOLIN	(3.3V)	-	EVOL IN		Electronic volume (handset mo
63	EVOLOUT	(3.3V)	-	EVOL OUT		Electronic volume (handset mo
64	EVOLREF	(3.3V)	-	EVOL REF		Electronic volume (handset mo
65	VSS			DG		Ground
66	IOP57	3.3V	YES	EX-HOOK	O	Not used
67	XMDMINT	3.3V	YES	XINTMDM		Modem interrupt
68	XINTMDM	3.3V	-	XMDMINT		Modem INT output/general out
69	XNMI/XINT	3.3V	YES	XNMI		NMI
70	EYECKO	MULT3/5	NO	EYECKO		Modem AFE connection (APD
71	APDMDT	3.3V	YES	APDMDT		Modem AFE connection
72	C3	MULT3/5	NO	C3		Modem AFE connection
73	C4	MULT3/5	NO	C4		Modem AFE connection
74	C5	MULT3/5	NO	C5		Modem AFE connection
75	MULT3/5			+5V		Power supply
76	DPDMDT	MULT3/5	NO	DPDMDT		Modem AFE connection
77	DPDMCK	MULT3/5	NO	DPDMCK		Modem AFE connection
78	MUTE	MULT3/5	NO	MUTE		Modem AFE connection
79	XEYESYC	MULT3/5	NO	XEYESYC		Modem eye pattern EYESYNC
80	EYEDAT	MULT3/5	NO	EYEDAT		Modem eye pattern EYEDAT
81	XRESETD	MULT3/5	NO	XRESETD		Modem AFE connection

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
82	CPUCK	3.3V	-	CPUCK		CPU clock (6MHz) output
83	XHOLDAK	3.3V	-	OPEN		Not used
84	XWAIT/IP60	3.3V	YES	HOOK		Hook detection
85	XHOLD/IP61	3.3V	YES	PULL DOWN		Not used
86	XHSTRD/IOP40	3.3V	YES	H/S MUTE	O	Handset TX mute
87	VSS			DG		Ground
88	XINMDM	3.3V	NO			20.736MHz crystal oscillator bu
89	XOUTMDM	3.3V	-			20.736MHz crystal oscillator bu
90	TEST1	3.3V	NO	+3.3V		Test pin. fixed High
91	TEST2	3.3V	NO	+3.3V		Test pin. fixed High
92	XTEST	3.3V	-	XTEST		24MHz clock output
93	TEST3	3.3V	NO	+3.3V		Test pin. fixed High
94	XOUT	3.3V	-	XOUT		24MHz oscillator
95	XIN	3.3V	NO	XIN		24MHz oscillator
96	VSS			DG		Ground
97	3.3V			+3.3V		Power supply
98	TEST4	3.3V	NO	+3.3V		Test pin. fixed High
99	XHSTWR/IOP41	3.3V	YES	RLY	O	Tel line relay control
100	XOPRBE/MUX/ OP53	3.3V	-	SP-MUTE		Speaker mute control
101	XRAS/IOP42	3.3V	NO	OPEN	O	Not used
102	XCAS1/IOP43	3.3V	NO	OPEN	O	Not used
103	XCAS2/IOP44	3.3V	NO	OPEN	O	Not used
104	DB3	3.3V	YES	D3		Data bus
105	DB2	3.3V	YES	2		Data bus
106	DB4	3.3V	YES	4		Data bus
107	DB1	3.3V	YES	1		Data bus
108	DB5	3.3V	YES	5		Data bus
109	DB0	3.3V	YES	0		Data bus
110	DB6	3.3V	YES	6		Data bus
111	DB7	3.3V	YES	D7		Data bus
112	XROMCS	3.3V	-	XROMCS		ROM chip select
113	XRD	3.3V	-	/RD		Read signal output
114	3.3V			+3.3V		Power supply
115	XWR	3.3V	-	/WR		Write signal output
116	ADR0	3.3V	-	A0		Address bus
117	ADR1	3.3V	-	1		Address bus
118	ADR2	3.3V	-	2		Address bus
119	VSS			DG		Ground
120	ADR3	3.3V	-	3		Address bus
121	ADR4	3.3V	-	4		Address bus
122	ADR5	3.3V	-	5		Address bus
123	ADR6	3.3V	-	6		Address bus

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
124	ADR7	3.3V	-	7		Address bus
125	ADR8	3.3V	-	8		Address bus
126	ADR9	3.3V	-	9		Address bus
127	ADR10	3.3V	-	10		Address bus
128	VSS			DG		Ground
129	3.3V			+3.3V		Power supply
130	ADR11	3.3V	-	11		Address bus
131	ADR12	3.3V	-	12		Address bus
132	RBA0	3.3V	-	A13		Bank address
133	RBA1	3.3V	-	14		Bank address
134	RBA2	3.3V	-	15		Bank address
135	RBA3	3.3V	-	16		Bank address
136	RBA4	3.3V	-	17		Bank address
137	RBA5/OP	3.3V	-	18		Not used
138	RBA6/IOP	3.3V	NO	19	O	Not used
139	XRESCS1/OP72	3.3V	-	OPEN		Not used
140	XRESCS2/OP71	3.3V	-	OPEN		Not used
141	XMDMCS/OP	3.3V	-	OPEN		Not used
142	VSS			DG		Ground
143	XRESCS3/OP52	3.3V	-	OPEN		Not used
144	20KOSC/IOP56	3.3V	YES	OPEN	O	Not used
145	ADR13	3.3V	-	OPEN		Not used
146	ADR14	3.3V	-	OPEN		Not used
147	3.3V			+3.3V		Power supply
148	ADR15	3.3V	-	OPEN		Not used
149	RM0/IOP00	3.3V	YES	T5	O	Motor control
150	RM1/IOP01	3.3V	YES	T4	O	Motor control
151	RM2/IOP02	3.3V	YES	T3	O	Motor control
152	RM3/IOP03	3.3V	YES	T2	O	Motor control
153	RXE/IP04	3.3V	YES	T0	O	Motor control
154	TM0/IOP10	3.3V	YES	LEDON	O	CIS LED control
155	TM1/IOP11	3.3V	YES	OPEN	O	Not used
156	TM2/IOP12	3.3V	YES	OPEN	O	Not used
157	TM3/IOP13	3.3V	YES	OPEN	O	Not used
158	TXE/IP14	3.3V	YES	PULL DOWN	I	Pull down
159	STB1	MULT3/5	NO	STB1	O	Thermal head strobe 1
160	STB2	MULT3/5	NO	STB2	O	Thermal head strobe 2
161	STB3	MULT3/5	NO	OPEN	O	Not used
162	STB4	MULT3/5	NO	OPEN	O	Not used
163	THDAT	MULT3/5	NO	TH DATA	O	Thermal data
164	VSS			DG		Ground
165	MULT3/5	-		+5V		Power supply for THCLK DAT
166	THCLK	MULT3/5	NO	TH CLK	O	Thermal head clock

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
167	THLAT	MULT3/5	NO	TH LAT	O	Thermal head latch
168	STBNP	3.3V	YES	CIS SEL		
169	3.3V			+3.3V		Power supply
170	TXD2/IOP	3.3V	YES	TH ON	O	Thermal head 24V ON
171	RXD2/IOP	3.3V	YES	RS	I/O	LCD control
172	RTS2/IOP	3.3V	YES	OPEN	O	Not used
173	CTS2/IOP	3.3V	YES	CIS ON	O	CIS 5v supply control
174	DSR2/IOP	3.3V	YES	MOTOR PO.	I	Motor position detection
175	DCD2/IOP	3.3V	YES	OPEN	O	Not used
176	DTR2/IOP	3.3V	YES	OPEN	O	Not used
177	RI2/IOP	3.3V	YES	OPEN	O	Not used
178	XRSTSWI/IP83	3.3V	YES	PULL DOWN		Pull down
179	KEYIN0	3.3V	YES	KIN0	I/O	Key read
180	KEYIN1	3.3V	YES	KIN1	I/O	Key read
181	KEYIN2	3.3V	YES	KIN2	I/O	Key read document sensor con
182	KEYIN3	3.3V	YES	KIN3	I/O	Key read read start position se control
183	KEYIN4	3.3V	YES	OPEN	O	Not used
184	KEYIN5	3.3V	YES	OPEN	O	Not used
185	OPLED	3.3V	YES	OPESEL	OD	Operation panel control
186	VSS			DG		GND
187	3.3V			3.3V	OD	Power supply
188	KSTART	3.3V	YES	KSTART	OD	LCD control
189	KLATCH	3.3V	YES	KLATCH	OD	Key scan LCD control
190	KSCLK	3.3V	YES	KSCLK	OD	Key scan LCD control
191	KTXD	3.3V	YES	KTXD	I	Key scan LCD control
192	KRXD	3.3V	YES	KRXD	O	Document read start position s
193	ADSEL1	3.3V	YES	ADSEL1		Thermal head temperature dete trigger
194	VSSC			DG		Ground for analog image proce
195	VREFB	Analog	-	VREFB		A/D reference-
196	VREFT	Analog	-	VREFT		A/D reference+
197	BIAS	Analog	-	BIAS		
198	VREFH	Analog	-	VREFH		A/D reference center
199	VDDC			+3.3V		Power supply for analog image
200	VSSA			DG		Ground for analog image proce
201	VDDA			+3.3V		Power supply for analog image
202	VDDB			+3.3V		Power supply for analog image
203	VCL	Analog	-	VCL		Clamp level
204	AIN3	Analog	-	AIN3		
205	AIN1	Analog	-	AIN1		Analog image signal (CIS outpu input)

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
206	AMON	Analog	-	OPEN		Not used
207	AIN2	Analog	-	AIN2		Thermistor voltage detection
208	VSSB			DG		Ground for analog image proce

5.3.3. ROM (IC2)

This 128 KB ROM (OTPROM or MASKROM) has 32 KB of common area and bank area (BK4~BK15). / The capacity of each bank is 8 KB. / The addresses of the common area are from 0000H to 7FFFH, and addresses 8000H to 9FFFH are for the bank area.

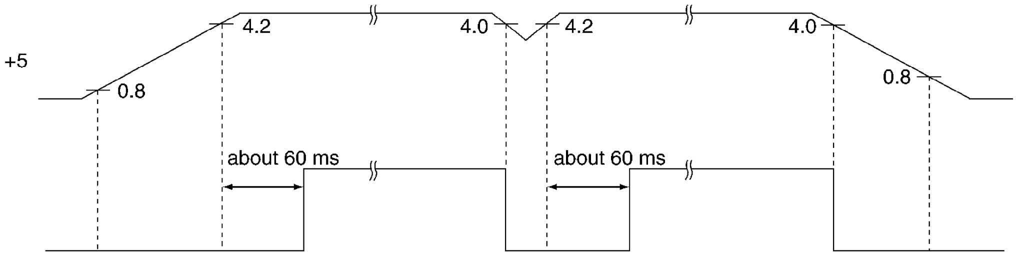
5.3.4. RAM (IC3)

This 32 KB RAM has 8 KB of common area and bank area (BK0, BK1). / The capacity of each bank is 12 KB. / The addresses of the common area are from D000H to EFFFH, and addresses A000H to CFFFH are for the bank area.

5.3.5. RESET CIRCUIT

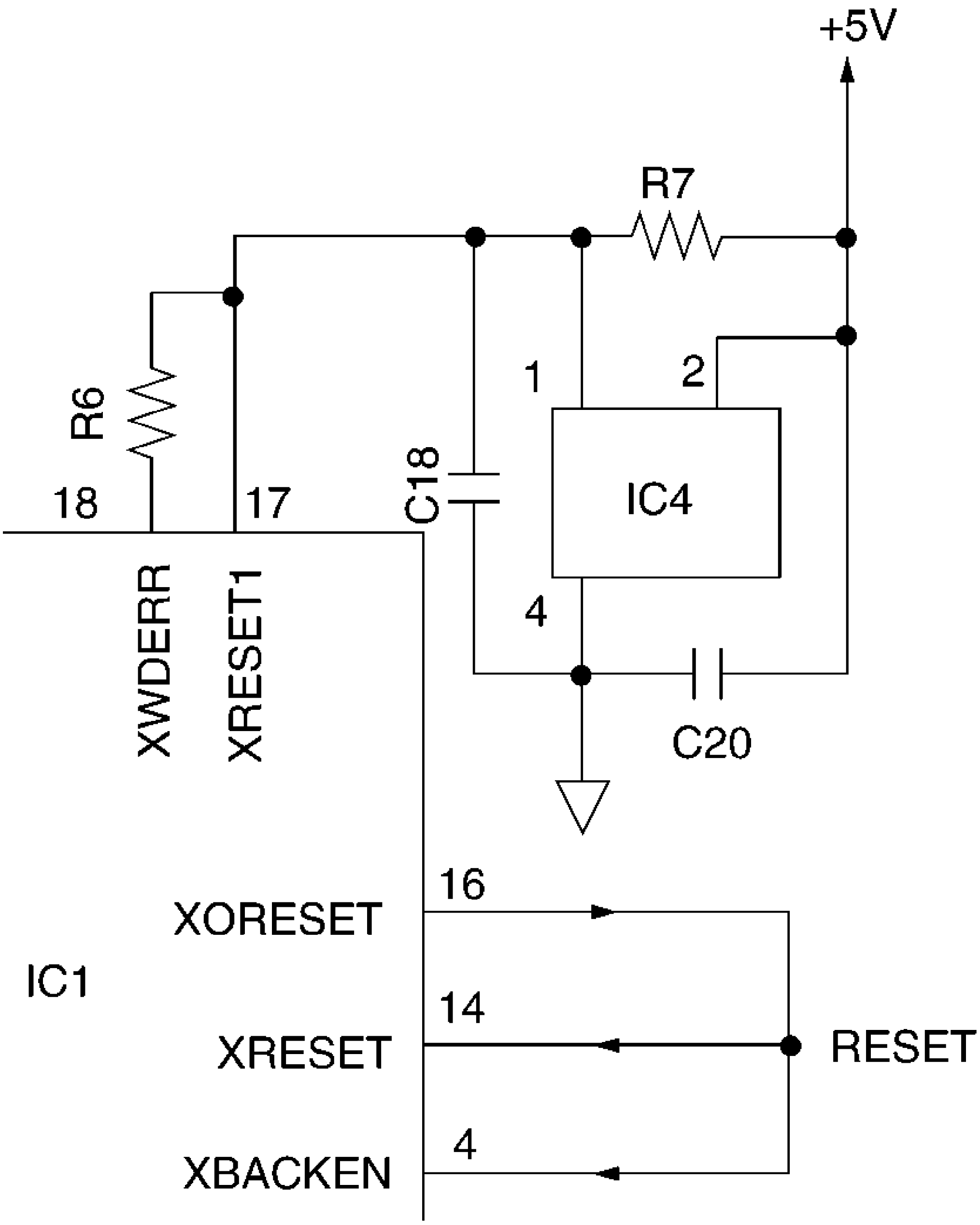
The output from pin 1 of the Reset IC (IC4) resets the gate array (IC1).
During a power surge, a positive reset pulse of 175 msec or more is generated and the system is reset completely. / This is done to prevent partial resetting and system runaway during a power fluctuation.

Timing Chart



When pin 1 of IC4 becomes low, it will prohibit the RAM (IC3) from changing data. / The RAM (IC3) will go into the backup mode, when it is backed up by a lithium battery.

Circuit Diagram


+5V
R7
R6
1
2
C18
18
17
IC4
4
XWDERR
XRESET1
C20
16
XORESET
IC1
14
XRESET
RESET
4
XBACKEN

The watch dog timer, built-in the gate array (IC1), is initialized about every 1.5 ms. / When a watch dog error occurs, pin 18 of the gate array (IC1) becomes low. / The terminal of the $\overline{\text{WDERR}}$ signal is connected to the reset line so the $\overline{\text{WDERR}}$ signal works as the reset signal.

5.3.6. SRAM and RTC BACK UP CIRCUIT

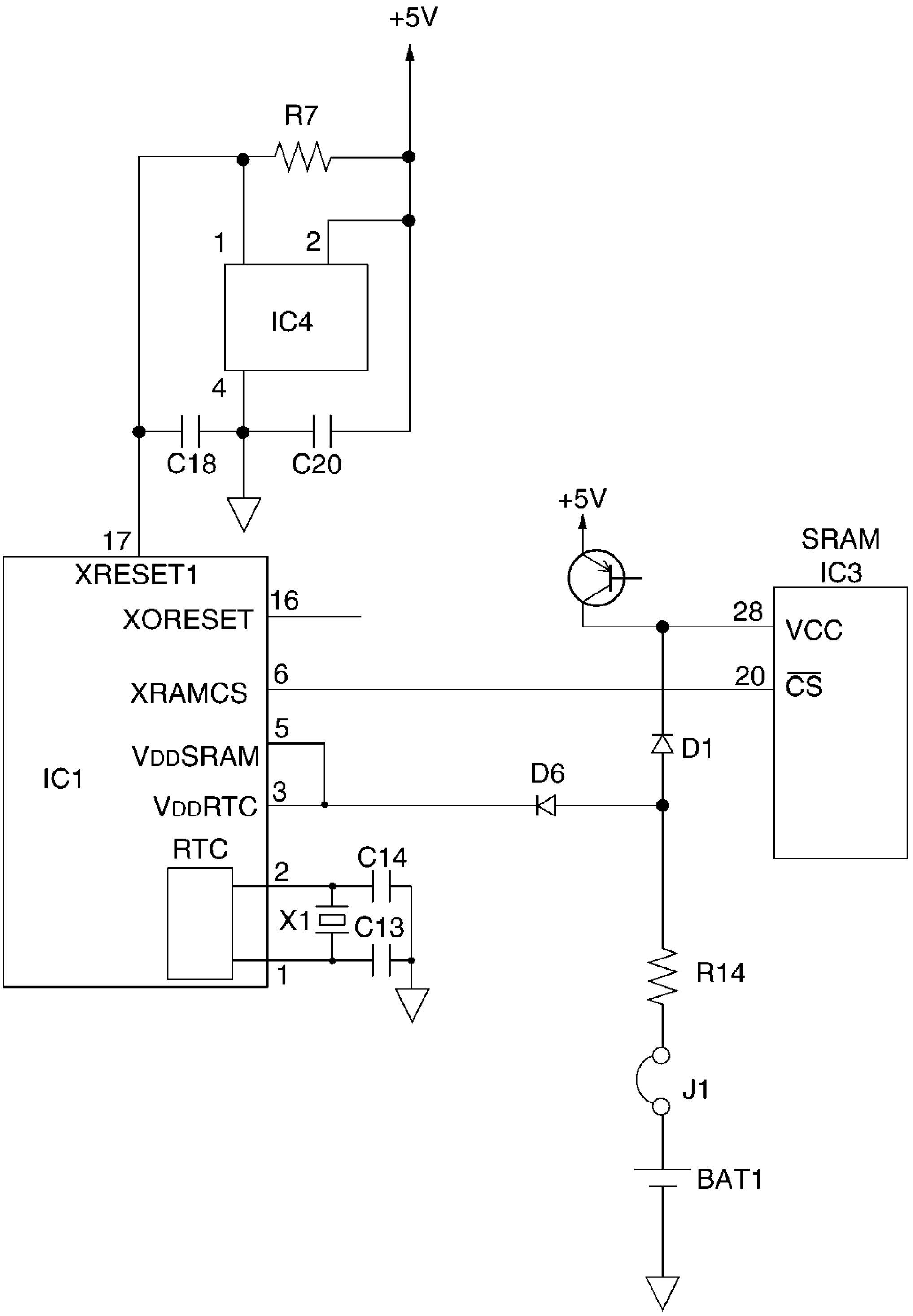
1. Function

This unit has a lithium battery (BAT1) which works for the RAM (IC3) and Real Time Clock (RTC, Integrated into ASIC:IC1). / The user parameter for auto dial numbers, the transmission ID, the system setup date and so on are stored in the RAM (IC3). / The RTC continues functioning, even when the power switch is OFF, backed up by a lithium battery.

2. Circuit Operation

When the power is turned ON, power is supplied RAM (IC3) and RTC (IC1). / At this time, the voltage at pin 28 of RAM is +5V and pin 3 of RTC (IC1) is +3.3V. When the power is turned OFF, the battery supplies the power to RAM and RTC through J1, R14,D1 or D7. At that time, the voltage at pin 28 of RAM and pin 3 of IC1 are about +2.5V. When the power is OFF and the +5V and +3.3V voltages decrease, IC4 detects them and LOW is input to pin 17 of IC1. Pin 16 of IC1 outputs the reset signals. Pin 28 of RAM (IC3) and pin 3 of RTC (IC1) become low, then RAM and RTC (IC1) go into the back up mode, when the power consumption is lower.

Circuit Diagram


+5V
R7
1
2
IC4
4
C18
C20
17
XRESET1
16
XORESET
6
XRAMCS
5
VDDSRAM
IC1
3
VDDRTC
RTC
2
1
X1
C14
C13
D6
+5V
SRAM
IC3
28
VCC
20
CS
D1
R14
J1
BAT1

5.3.7. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

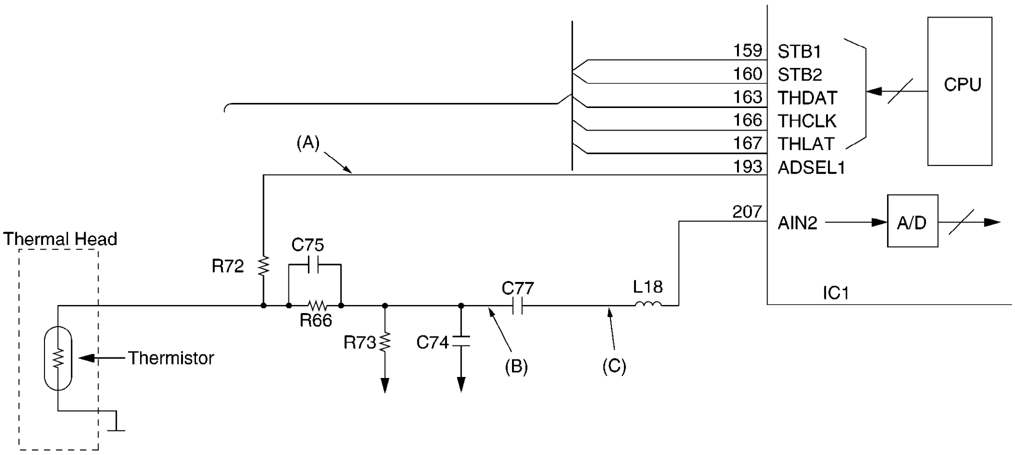
1. Function

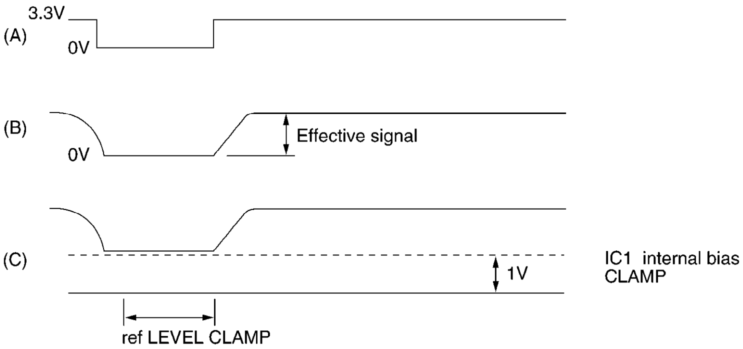
The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. / The output of pin 193

of IC1 becomes a low level. / Then when it becomes a high level, it triggers point (A). / In point (C), according to the voltage output time, the thermal head's temperature is detected.

After the thermal head temperature is converted to voltage in (B), it is then changed to digital data in the A/D converter inside IC1. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram

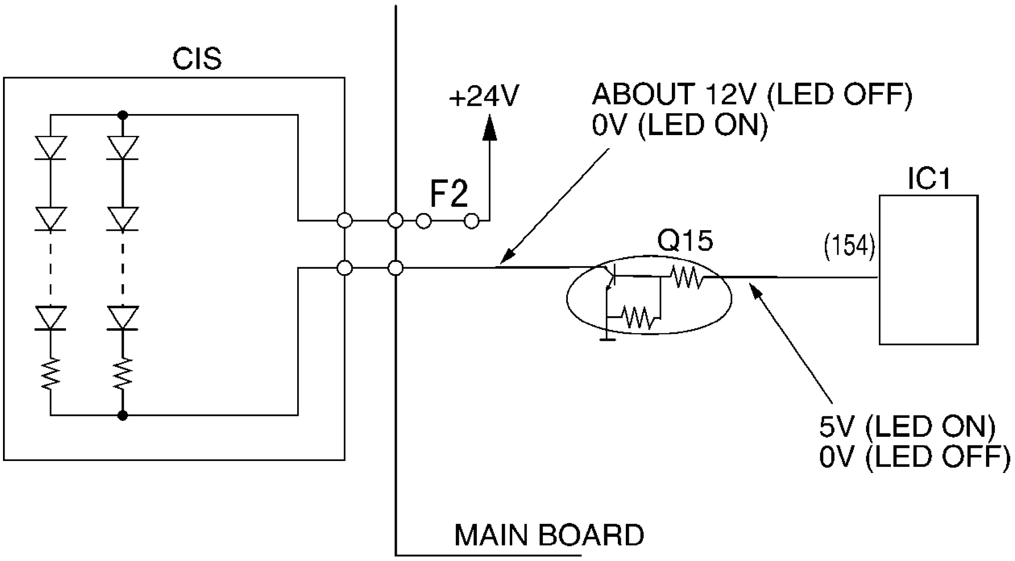

159 STB1
160 STB2
163 THDAT
166 THCLK
167 THLAT
193 ADSEL1
CPU
207 AIN2
A/D
IC1
(A)
Thermal Head
R72
C75
R66
R73
C74
C77
L18
Thermistor
(B)
(C)


3.3V
(A)
0V
(B)
0V
Effective signal
(C)
1V
IC1 internal bias
CLAMP
ref LEVEL CLAMP

5.3.8. LED ARRAY(CIS)

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. / It is also possible to light the LED ARRAY in the test mode.

Circuit Diagram



5.4. FACSIMILE SECTION

5.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

1. Line information is read by CIS, via route (1), and is input to IC1.
2. In IC1, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route (2) it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route (3). Then via routes (4) and (5), it is stored in RAM as shading data.
3. The draft's information that is read by CIS is input to IC1 via route (1). After it is adjusted to a suitable level for A/D conversion via route (2), the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. / The other side, the shading data which flows from RAM via routes (6) and (7), is input to the Image Processing Section. / After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". / Then via routes (4) and (5), they are stored in RAM.
4. The white/black data stored as above is input to the P/S converter via routes (6) and (8). / The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route (9) and is printed out on recording paper.

Note:
Standard: Reads 3.85 times/mm
Fine: Reads 7.7 times/mm
Super-Fine: Reads 15.4 times/mm

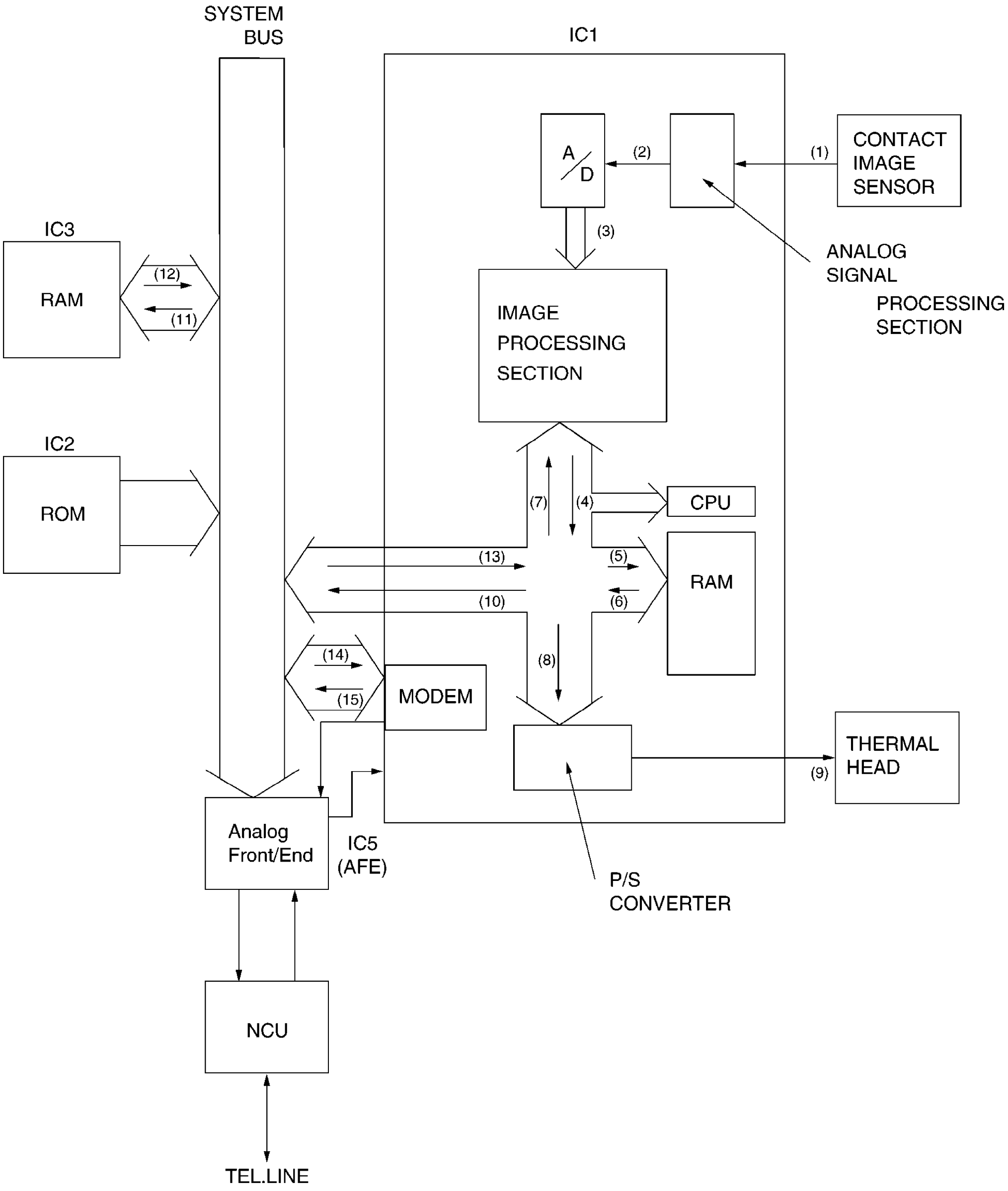
Transmission

1. **Same processing as COPY items 1) - 3).**
2. **The data stored in RAM of IC1 is output from IC1 via routes (6) and (10), and is stored in the system bus. / Via route (11), it is stored in the communication buffer inside RAM (IC3).**
3. **While fetching data stored in the communication buffer synchronous with the modem, the CPU inputs data to the modem along route (12) and (14). / In the analog front end IC (IC5) it is converted to serial analog data and forwarded over telephone lines via the NCU Section.**

Reception

1. **The serial analog image data is received over telephone lines and input to the analog front end IC (IC5) via the NCU section, where it is demodulated to parallel digital data. The balance data is sent to the modem. Then the CPU stores the data in the communication buffer of RAM (IC3) along route (11) and (15).**
2. **The data stored in RAM (IC3) is decoded by the CPU via route (12), and is stored in RAM by routes (13) and (5).**
3. **Same processing as COPY item 4).**

5.4.2. BLOCK DIAGRAM

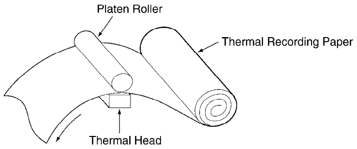

SYSTEM BUS
IC1
IC3
RAM
(12)
(11)
IC2
ROM
A/D
(2)
(1)
CONTACT IMAGE SENSOR
(3)
ANALOG SIGNAL PROCESSING SECTION
IMAGE PROCESSING SECTION
(7)
(4)
CPU
(13)
(5)
RAM
(10)
(6)
(14)
(15)
MODEM
(8)
THERMAL HEAD
(9)
Analog Front/End
IC5 (AFE)
P/S CONVERTER
NCU
TEL.LINE

5.4.3. THERMAL HEAD

1. Function

This unit utilizes state of the art thermal printer technology. / The recording paper (roll paper) is chemically processed. When the thermal head contacts this paper it emits heat momentarily, and black dots (appearing like points) are printed on the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)

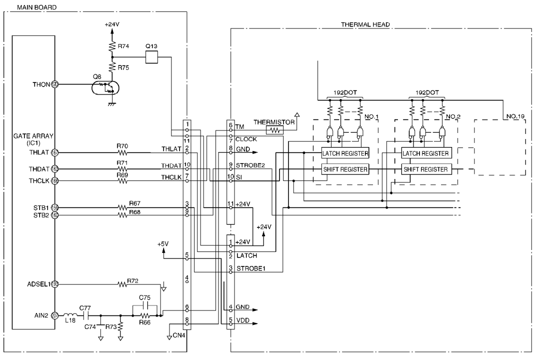


2. Circuit Operation

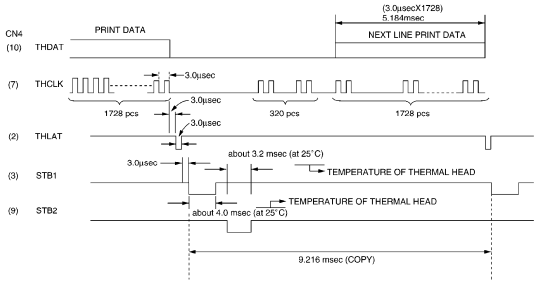
There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat emitting registers. This means that one line is at a density of 192×9=1728 dots=(8 dots/mm). / White/Black (white=0, black=1) data in one line increments is synchronized at IC1 pin 166 (THCLK), and sent from IC1 pin 163 (THDAT) to the shift register of the ICs. The shift registers of the 9 ICs are connected in series, and upon the shift of dot increment 1728, all the shift registers become filled with data, and a latch pulse is emitted to each IC from IC1 pin 167 (THLAT).

With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC1 pins (159, 160) only black dot locations (=1) among latched data activates the driver, and the current passes to heat the emitting body causing heat emission. / Here, the three line strobes, STB1 to STB2, impress at intervals of 9.216 msec, as required for one-line printout. / The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC1 pin 207. (See BLOCK DIAGRAM ().) Depending on that value, the strobe width is recorded in ROM (IC2). / Accordingly, the strobe width is determined. / When the thermal head is not used, the IC1 (170, THON) becomes low, Q8 turns OFF, Q13 turns OFF, and the +24 V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram


MAIN BOARD
THERMAL HEAD
+24V
R74
Q13
R75
Q8
THON
GATE ARRAY (IC1)
THLAT
THDAT
THCLK
STB1
STB2
ADSEL1
AIN2
R70
R71
R69
R67
R68
R72
C77
L18
C74
R73
C75
R66
CN4
+5V
192DOT
192DOT
NO.1
NO.2
NO.19
THERMISTOR
TM
CLOCK
GND
STROBE2
SI
+24V
LATCH
STROBE1
GND
VDD
LATCH REGISTER
SHIFT REGISTER

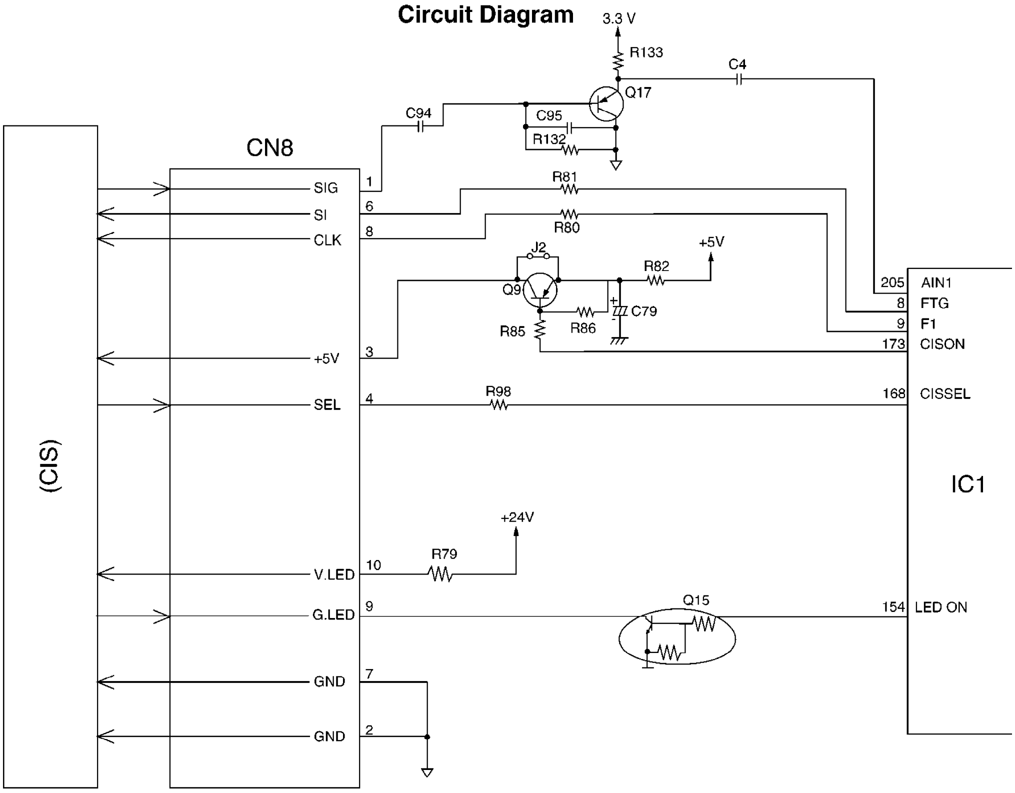
Timing Chart



5.4.4. SCANNING BLOCK

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram


3.3 V
R133
C4
Q17
C94
C95
R132
CN8
(CIS)
SIG
SI
CLK
+5V
SEL
V.LED
G.LED
GND
GND
1
6
8
3
4
10
9
7
2
R81
R80
J2
Q9
R82
+5V
C79
R85
R86
R98
+24V
R79
Q15
205
8
9
173
168
154
AIN1
FTG
F1
CISON
CISSEL
LED ON
IC1

When an original is inserted and the start button pressed, pin 154 of IC1 goes to a high level and the transistor inside IC7 turns on. This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC1, and the original image

illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (AIN). The analog image signal is input to the system LSI (IC1) on ANA1 (pin 205 of IC1) and converted into 8-bit data by the A/D converter inside IC1. Then this signal undergoes digital processing in order to obtain a high-quality image.

5.4.5. STEPPING MOTOR DRIVE CIRCUIT

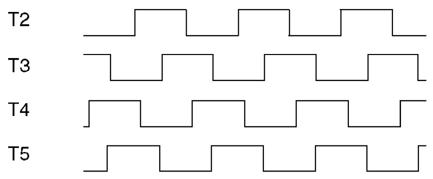
1. Function

One individual stepping motor is used for transmission and reception. It feeds the document or recording paper synchronized for reading or printing.

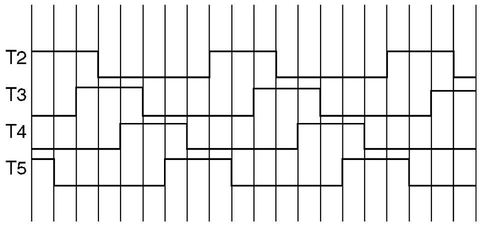
2. Circuit Operation

During motor drive, gate array IC1 pin 153 becomes a high level, and Q14 and Q7 go ON as a result. +24 V is supplied to the motor coil. / Stepping pulses are output from gate array IC1, causing driver IC7 to go ON. The motor coil is energized sequentially in 2 phase increments or 1-2 phase increments, which causes a 1-step rotation. A 1-step rotation is 0.13mm of recording paper or document paper. The timing chart is below.

Timing chart (2 Phase)



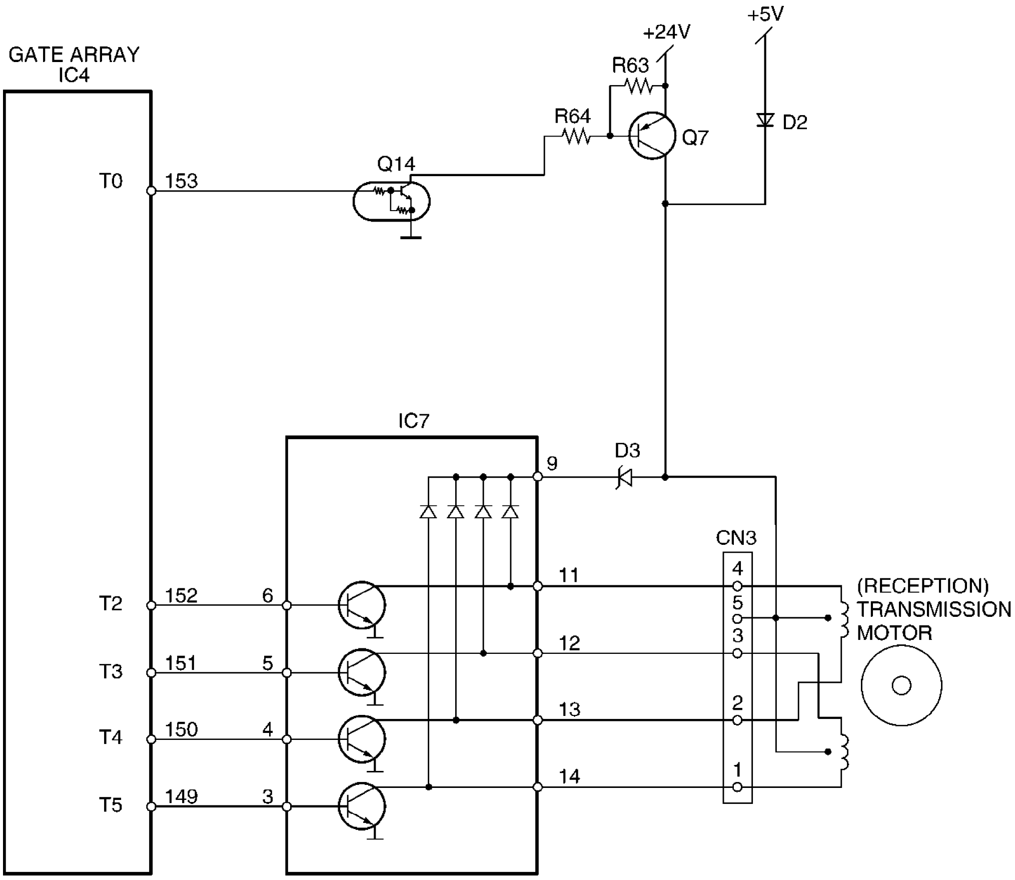
1-2. Phase (Asic T2-T5, output)



Stepping Motor Phase Pattern

Function	Mode	Phase Pattern	Speed
Copy	Fine/Half Tone	1-2	217 pps
	Super Fine	1-2	108.5 pps
FAX	STD	2	217 pps
	Fine/Half Tone	1-2	217 pps
	Super Fine	1-2	108.5 pps
———	Paper Feed	2-2	434 pps

Circuit Diagram



GATE ARRAY
IC4
T0
153
Q14
R64
R63
+24V
+5V
Q7
D2
IC7
9
D3
CN3
T2
152
6
11
T3
151
5
12
T4
150
4
13
T5
149
3
14
4
5
3
2
1
(RECEPTION)
TRANSMISSION
MOTOR

When the motor is OFF, gate array IC1 pin 153 becomes a low level and Q14 and Q7 also turns OFF. Instead of +24V, +5V is supplied through D2 so that the motor is held in place.

5.4.6. GEAR SECTION

This section shows how the motor-driven gear mechanism works in the main operations: FAX transmission, FAX reception the motor and copying.

5.4.6.1. MODE SELECTION

When the motor attached to the Drive Motor Gear rotates counterclockwise (CCW), Swing Gear A-2 engages the CAM and the CAM turns counterclockwise to select a mode. (See Fig. A.) There are three mode options controlled by the Switch: A: Transmitmode, B: Receive mode and C: Copy mode. In Fig. B, you can see which mode is selected by the position of the rib in the CAM.

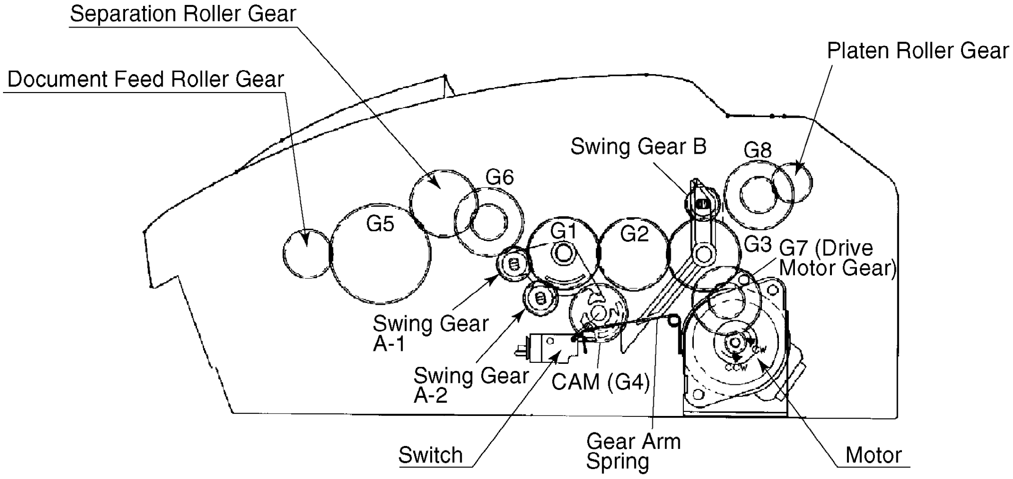
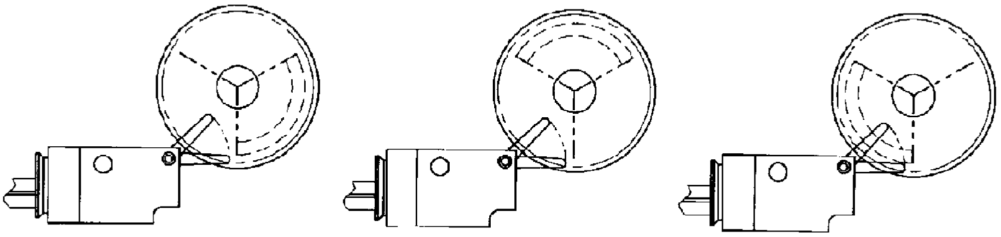

Separation Roller Gear
Document Feed Roller Gear
Platen Roller Gear
Swing Gear B
G8
G6
G5
G1
G2
G3
G7 (Drive Motor Gear)
Swing Gear A-1
Swing Gear A-2
CAM (G4)
Switch
Gear Arm Spring
Motor

Fig. A [The operation is in the Transmit mode (A).]



A: Transmit mode B: Receive mode C: Copy mode

Fig. B

5.4.6.2. MODE OPERATION

Once a mode is selected, the Drive Motor Gear rotates clockwise (CW) and then the Swing Gear A-1 controls the mode operation.

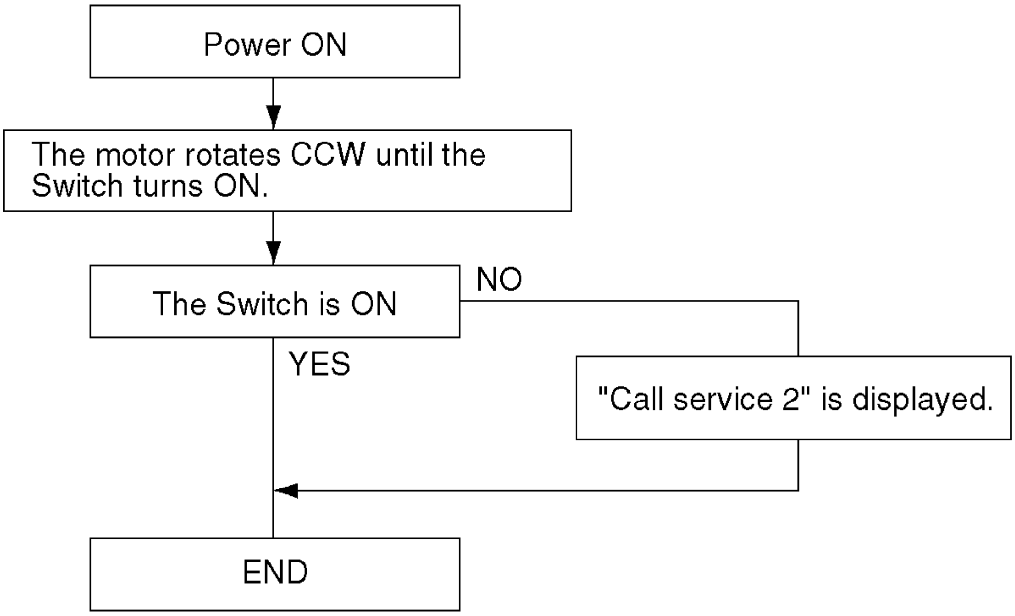
A: Transmit mode
Swing Gear A-1 engages G6 and conveys its drive power to the Separation Roller Gear for pre-feeding documents.

B: Receive mode
Swing Gear B engages G8 and conveys its drive power to the Platen Roller Gear for printing the received data.

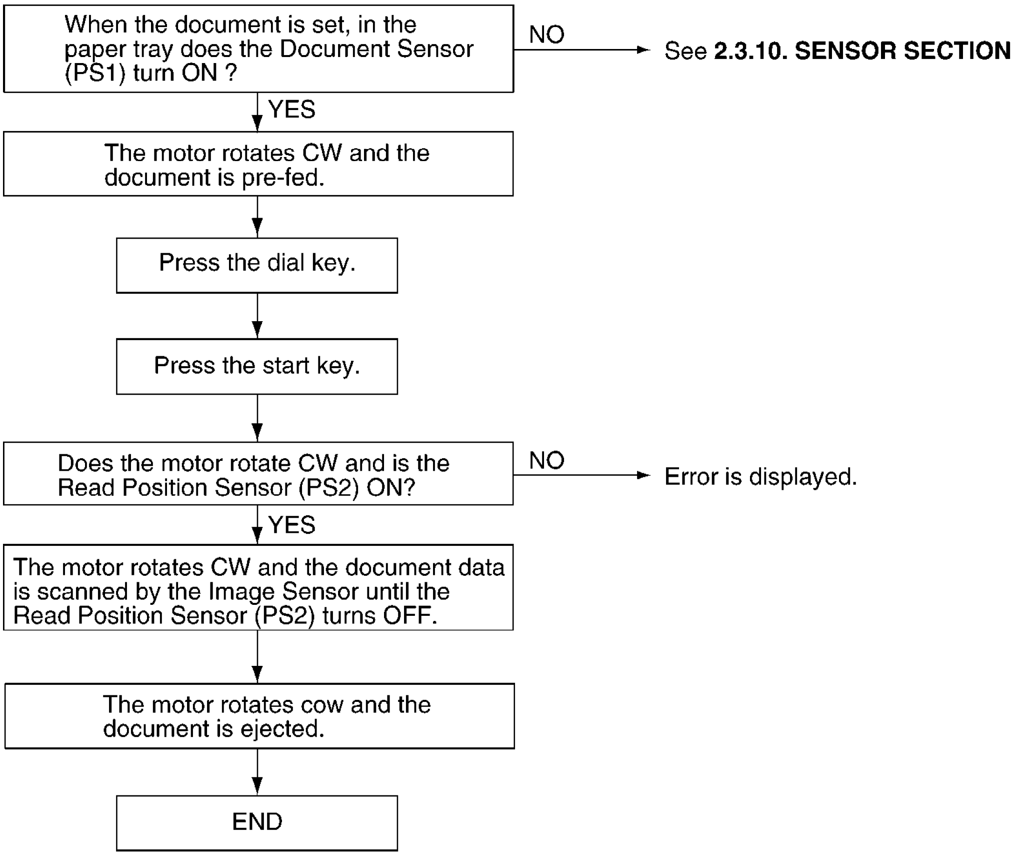
C: Copy mode
Swing Gear A-1 and B engage Gears 6 and 8 respectively and drive both the Separation Roller Gear and the Platen Roller Gear for feeding documents and recording paper in the copying operation.

5.4.6.3. MECHANICAL MOVEMENTS IN THE MAIN OPERATIONS

5.4.6.3.1. IDLE STATUS


Power ON
The motor rotates CCW until the Switch turns ON.
The Switch is ON
NO
YES
"Call service 2" is displayed.
END

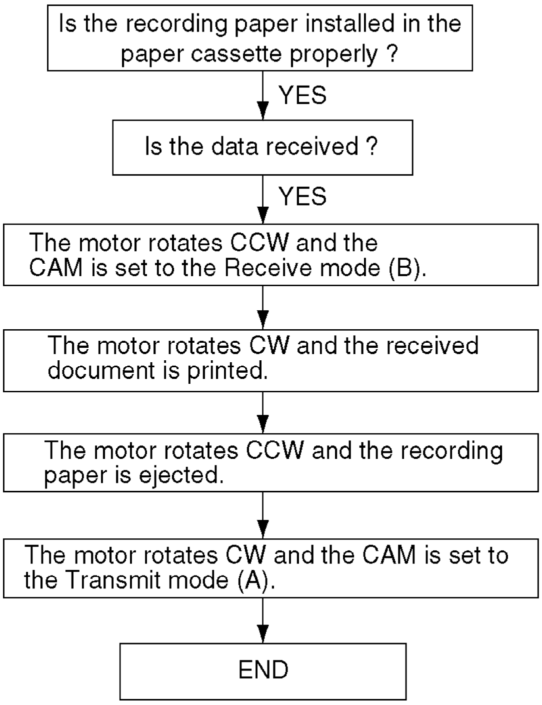
5.4.6.3.2. SCANNING


When the document is set, in the paper tray does the Document Sensor (PS1) turn ON ?
NO
See 2.3.10. SENSOR SECTION
YES
The motor rotates CW and the document is pre-fed.
Press the dial key.
Press the start key.
Does the motor rotate CW and is the Read Position Sensor (PS2) ON?
NO
Error is displayed.
YES
The motor rotates CW and the document data is scanned by the Image Sensor until the Read Position Sensor (PS2) turns OFF.
The motor rotates cow and the document is ejected.
END

CROSS REFERENCE:

SENSOR SECTION ()

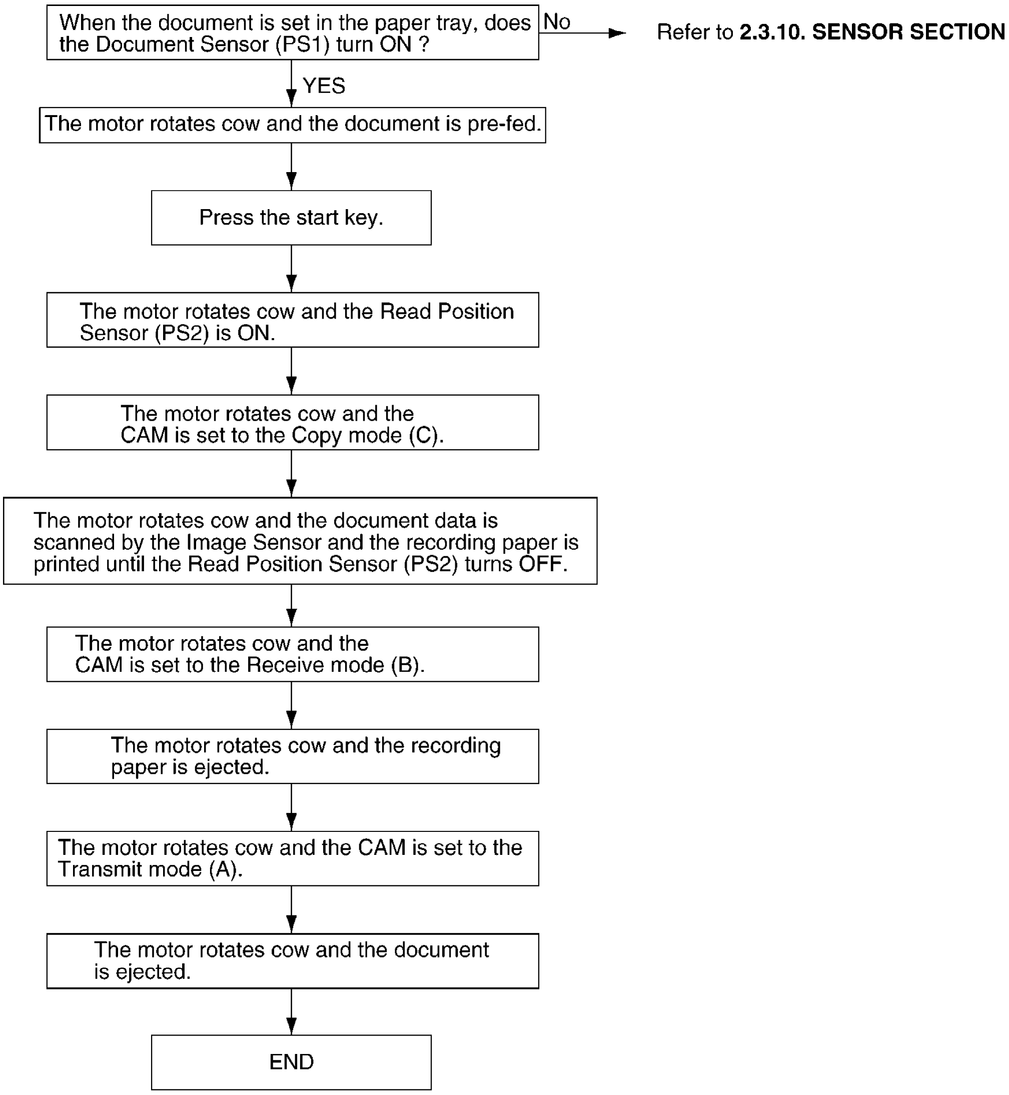
5.4.6.3.3. PRINTING


Is the recording paper installed in the paper cassette properly ?
YES
Is the data received ?
YES
The motor rotates CCW and the CAM is set to the Receive mode (B).
The motor rotates CW and the received document is printed.
The motor rotates CCW and the recording paper is ejected.
The motor rotates CW and the CAM is set to the Transmit mode (A).
END

Note:

See 6.5. SENSERS AND SWITCHES.

5.4.6.3.4. COPYING


When the document is set in the paper tray, does the Document Sensor (PS1) turn ON ?
No
Refer to **2.3.10. SENSOR SECTION**
YES
The motor rotates cow and the document is pre-fed.
Press the start key.
The motor rotates cow and the Read Position Sensor (PS2) is ON.
The motor rotates cow and the CAM is set to the Copy mode (C).
The motor rotates cow and the document data is scanned by the Image Sensor and the recording paper is printed until the Read Position Sensor (PS2) turns OFF.
The motor rotates cow and the CAM is set to the Receive mode (B).
The motor rotates cow and the recording paper is ejected.
The motor rotates cow and the CAM is set to the Transmit mode (A).
The motor rotates cow and the document is ejected.
END

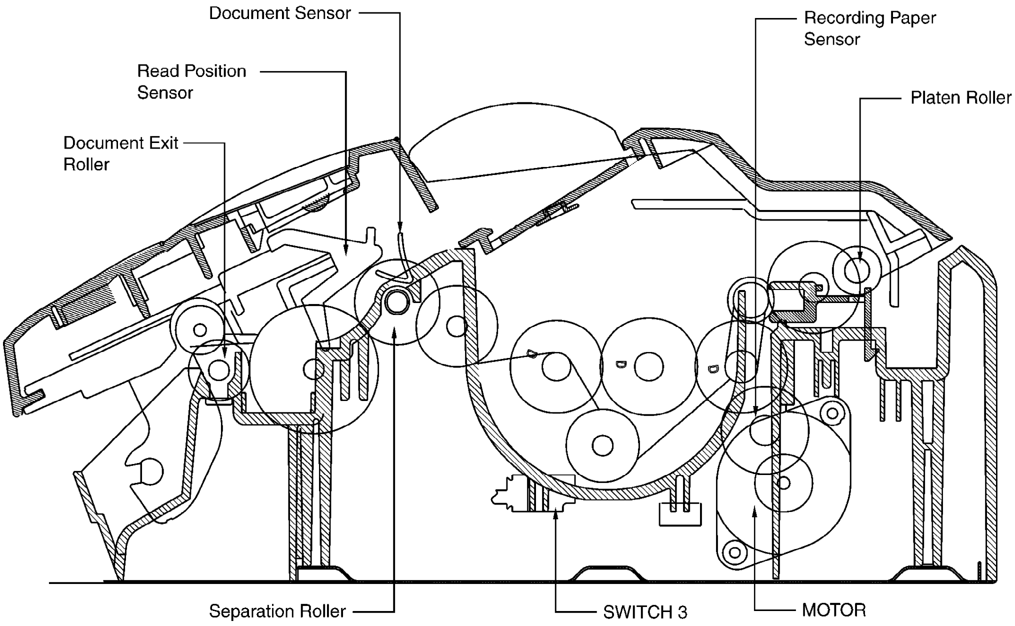
CROSS REFERENCE:

SENSOR SECTION ()

5.5. SENSORS AND SWITCHES

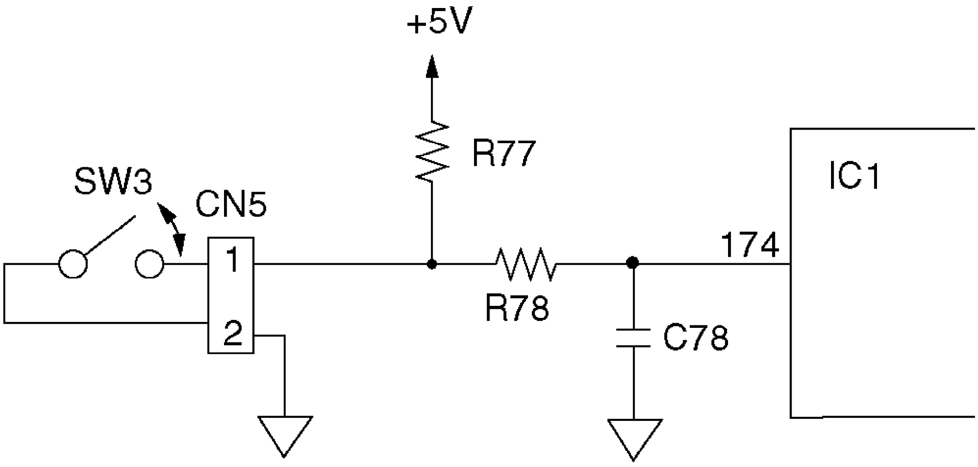
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Digital	**SW3**	**Motor Position**	———
Analog	**SW1**	**Cover Open and Paper set**	**[CHECK COVER] and [OUT OF PAPER]**
	SW2	**Hook SW**	———
Operation Panel	**PS2**	**Document Read Position**	**[REMOVE DOCUMENT]**
	PS1	**Document**	**[CHECK DOCUMENT]**


Document Sensor
Read Position Sensor
Document Exit Roller
Recording Paper Sensor
Platen Roller
Separation Roller
SWITCH 3
MOTOR

5.5.1. MOTOR POSITION SENSOR

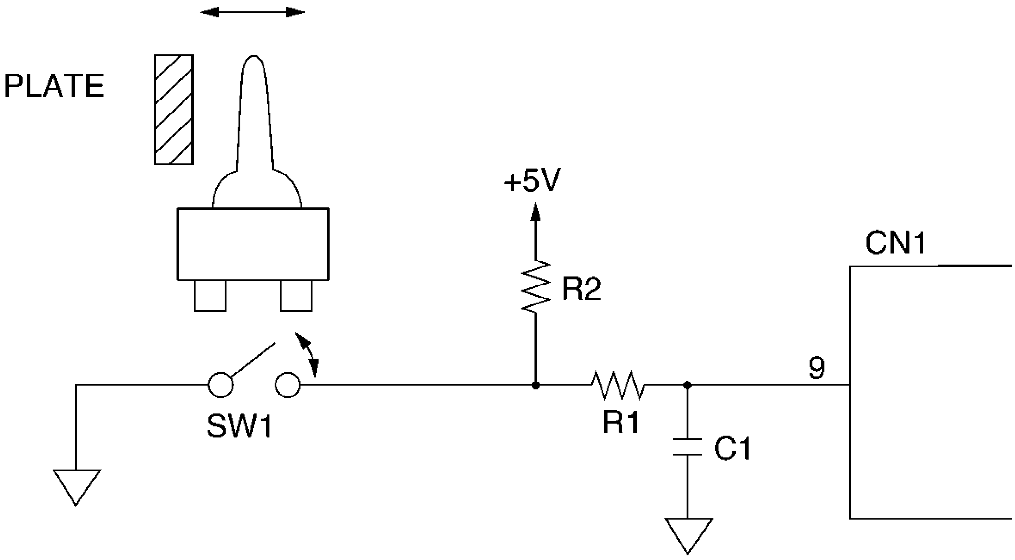
This sensor is a detection switch for recording the position of the CAM.


+5V
R77
SW3
CN5
1
2
R78
C78
174
IC1

Digital Board	
	Signal (IC1-174 Pin)
Home position	**Low level**
Other	**High level**

5.5.2. COVER OPEN AND PAPER SET SWITCH (SW1)

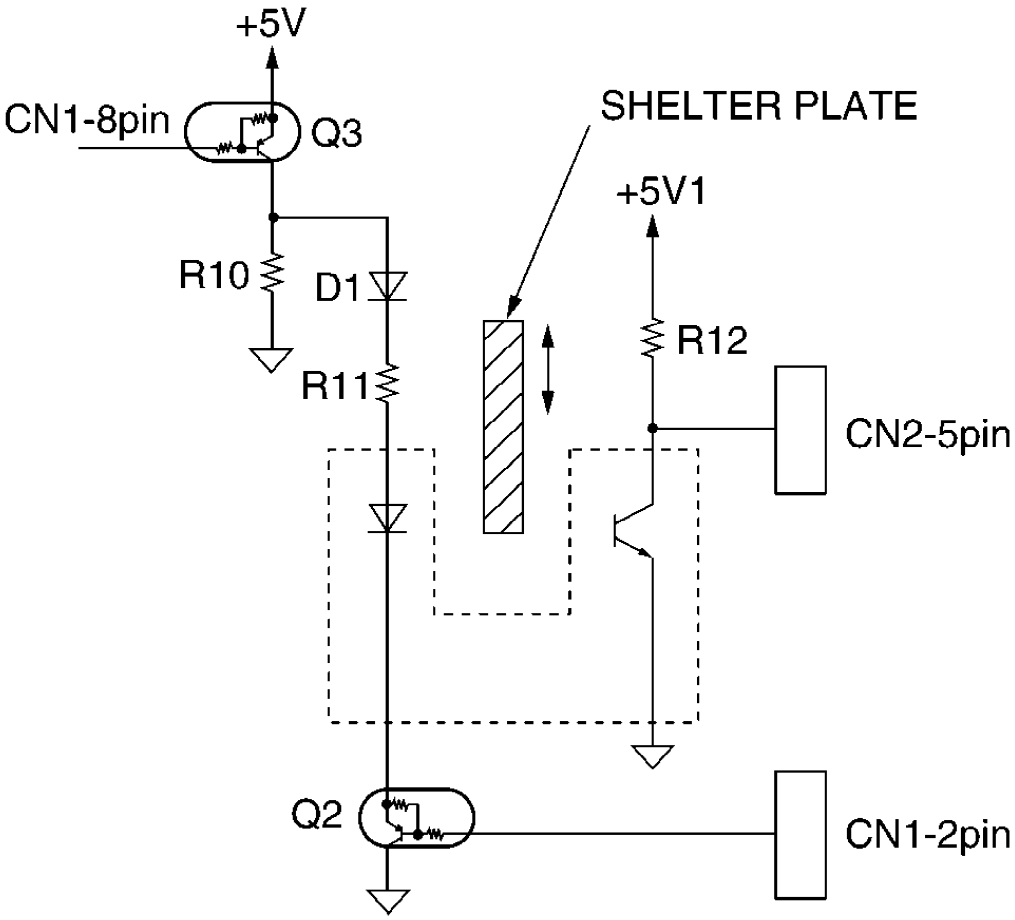
When there is no recording paper, the plate is separated from the switch lever and the switch turns off. / Pin 9 of CN101 (Analog board) becomes a high level. / When there is recording paper, the plate pushes the switch lever and the switch turns ON. / Pin 9 of CN101 (Analog board) becomes a low level.



Analog Board	
	Signal (CN1-9 Pin)
Paper	Low level
No paper	High level

5.5.3. READ POSITION (PS2)

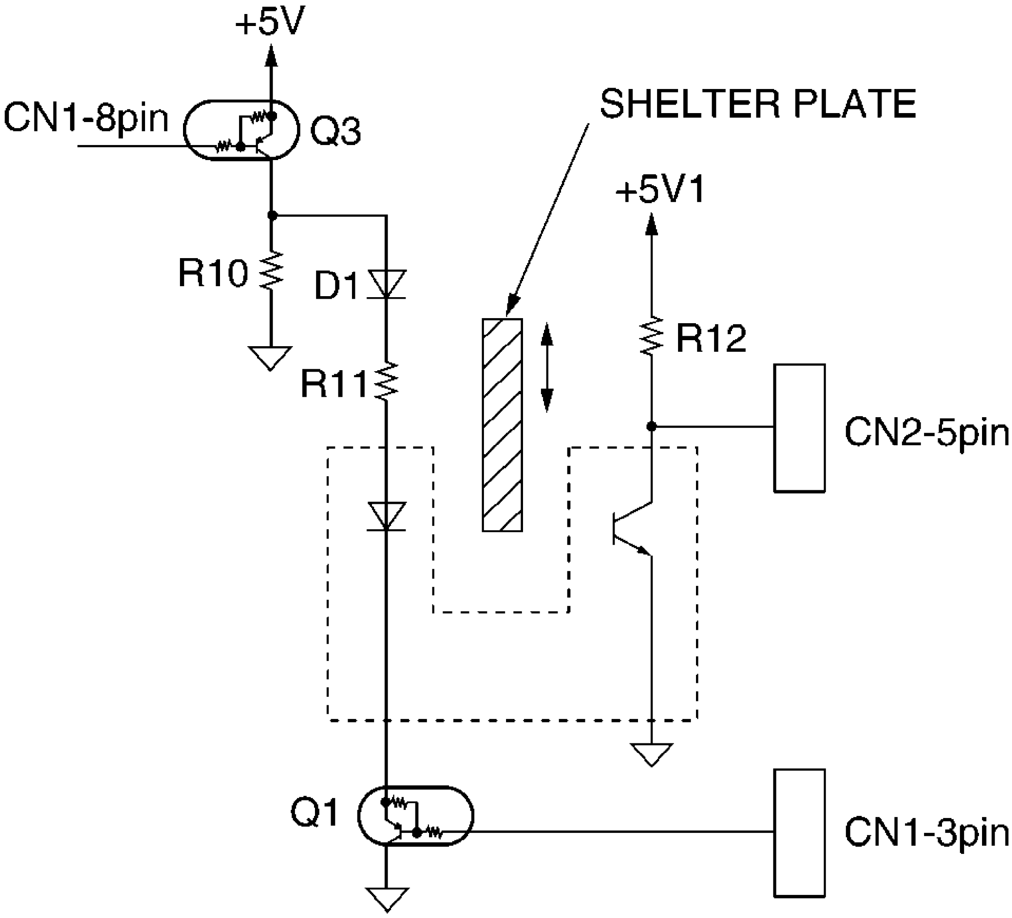
When a document is brought to the read position, the shelter plate passes the sensor light, the photo transistor becomes ON, and the input signal of the CN2-5 pin (Operation) becomes a low level. When there is no document at the read position, the shelter plate closes the sensor light, the photo transistor becomes OFF, and the input signal of the CN2-5 pin (Operation) becomes a high level. (When checking this sensor, CN1-8 pin, 2pin becomes low level).


+5V
CN1-8pin
Q3
SHELTER PLATE
+5V1
R10
D1
R12
R11
CN2-5pin
Q2
CN1-2pin

Operation Board		
	Photo transistor	**Signal (CN2-5 Pin)**
Out of the Read Position	**OFF**	**High level**
At the Read Position	**ON**	**Low level**

5.5.4. DOCUMENT SENSOR (PS1)

When a document is set, the shelter plate closes the sensor light, the photo transistor becomes OFF, and the input signal of the CN2-5 pin (Operation) becomes a high level. When there is no document, the shelter plate passes the sensor light, the photo transistor becomes ON, and the input signal of the CN2-5 pin (Operation) becomes a low level. / (When checking this sensor, the CN1-8 pin, 3pin becomes a low level.)



Operation Board		
	Photo transistor	Signal (CN2-5 Pin)
No document	ON	Low level
Set document	OFF	High level

5.6. MODEM SECTION

5.6.1. FUNCTION

The unit uses a 1 chip modem (IC1), enabling it to act as an interface between the control section for FAX sending and receiving, and the telephone line. During a sending operation, the digital image signals are modulated and sent to the telephone line. During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC1) has hardware which sends and detects all of the necessary signals for FAX communication and DTMF. / It can be controlled by writing commands from the ASIC (IC1) to the register in the modem (IC1). / This modem (IC1) also sends DTMF signals, generates a call tone (from the speaker), and detects busy tones, dial tones and DTMF.

Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON ITU-T (International Telecommunications' Union.)

The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Uniib (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

A-4 size documents without using formats which reduce the band width of a signal sent over telephone lines. / Determined in 1968. / Transmission for about 6 minutes at scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes. / Methods to suppress redundancy are not used. / Determined in 1976.

- Group III (G3)

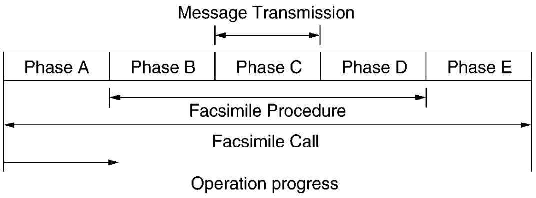
A method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent with about one minute. / Determined in 1980.

- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible. / The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc. and for terminal control. It implements the terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C are repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was in fact sent, and to check for telephone reservations and/or the existence of continuous transmission.

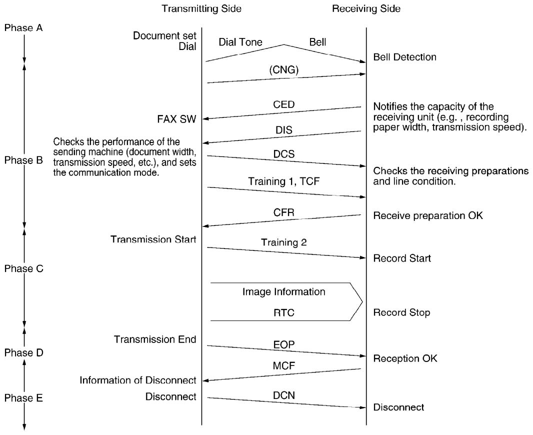
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension: MH Mode 2 dimension: MR Mode (K=2.4)
Resolution	Main Scan: 8 pel/mm Sub Scan: 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value: 10, 20 Can be recognized in 40ms.

6. Explanation of Technology

a. G3 Communication Signals (T. 30 Binary Process)

For G3 facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. / Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. / An example of the binary process in G3 communication is shown below.


Transmitting Side
Receiving Side
Phase A
Document set
Dial
Dial Tone
Bell
Bell Detection
(CNG)
CED
FAX SW
Notifies the capacity of the receiving unit (e.g. , recording paper width, transmission speed).
DIS
Checks the performance of the sending machine (document width, transmission speed, etc.), and sets the communication mode.
Phase B
DCS
Checks the receiving preparations and line condition.
Training 1, TCF
CFR
Receive preparation OK
Transmission Start
Training 2
Record Start
Phase C
Image Information
RTC
Record Stop
Transmission End
EOP
Phase D
Reception OK
MCF
Information of Disconnect
Phase E
Disconnect
DCN
Disconnect

Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and of the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) / Identification Signal Format.....00000001

Function: / Notifies the capacity of the receiving unit. The added data signals are as follows.

(Example)

Bit No.	DIS/DTC	DCS
1	Transmitter - T.2 operation	
2	Receiver - T.2 operation	Receiver - T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter - T.3 operation	
5	Receiver - T.3 operation	Receiver - T.3 operation
6	Reserved for future T.3 operation features.	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter - T.4 operation	
10	Receiver - T.4 operation	Receiver - T.4 operation
11, 12	Data signaling rate	Data signaling rate
(0, 0)	V.27 ter fall back mode	2400 bit/s, V.27 ter
(0, 1)	V.27 ter	4800 bit/s, V.27 ter
(1, 0)	V.29	9600 bit/s, V.29
(1, 1)	V.27 ter and V.29	7200 bit/s, V.29
13	Reserved for the new modulation system.	
14	Reserved for the new modulation system.	
15	Vertical resolution = 7.7 line/mm	Vertical resolution = 7.7 line/mm
16	Two-dimensional coding capability	Two-dimensional coding

Bit No.	DIS/DTC	DCS
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of 215 mm ± 1%	1728 picture elements along scan length of 215 mm ± 1%
(0, 1)	1728 picture elements along scan line length of 215 mm ± 1% and 2048 picture elements along scan line length of 255 mm ± 1% and 2432 picture elements along scan line length of 303 mm ± 1%	2432 picture elements along scan length of 303 mm ± 1%
(1, 0)	1728 picture elements along scan line length of 215 mm ± 1% and 2048 picture elements along scan line length of 255 mm ± 1%	2048 picture elements along scan length of 255 mm ± 1%
(1, 1)	Invalid	Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid

Signal.....DCS (Digital Command Signal) / Identification Signal Format.....X1000001
Function: / Notifies the capacity of the receiving machine obtained at DIS and announces the transmission mode of the sender. The added data signals are as follows.

(Example)

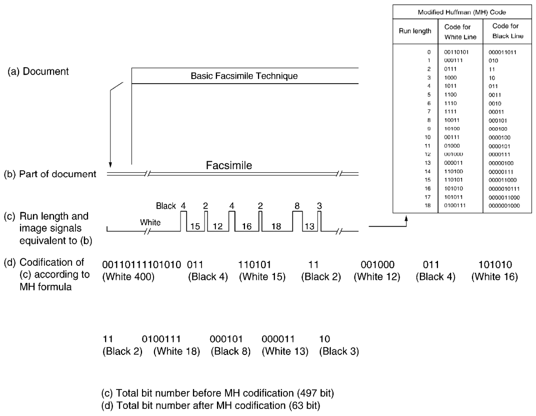
Bit No.	DIS/DTC	Standard setting	DCS
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 l/mm: T7.7 = T3.85 40 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = T3.85 5 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 20 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 40 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 0 ms at 3.85 l/mm: T7.7 = T3.85		Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	1	Extend field
25	2400 bit/s handshaking	0	2400 bit/s handshaking
26	Uncompressed mode	0	Uncompressed mode
27	Error correction mode	0	Error correction mode
28	Set to "0".	0	Frame size 0 = 256 octets 1 octets
29	Error limiting mode	0	Error limiting mode
30	Reserved for G4 capability on PSTN	0	Reserved for G4 capability
31	Unassigned	0	
32	Extend field	1	Extend field
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	0	Recording width Recording width indicated b 18 Recording width indicated b field bit / information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	0	Middle 1216 elements of 172 elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	0	Middle 864 elements of 1728 elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	0	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	0	Invalid
38	Reserved for future recording width capabilities.	0	
39	Reserved for future recording width capabilities.	0	
40	Extend field	1	Extend field
41	Semi super time / mm	1	
42	Semi super time / mm	0	
43	Super time	0	

Bit No.	DIS/DTC	Standard setting	DCS
44	Inch	0	
45	mm	1	
46	MSC/SF	0	
47	Select Polling	0	
48	EXT	0	

Note 1 - Standard facsimile units conforming to T.2 must have the following capability: Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability: Index of cooperation (IOC)=264.
Note 3 - Standard facsimile units conforming to T.4 must have the following capability: Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	———————	**A fixed pattern is transmitted to the receivin at a speed (2400 to 9600 bps) designated by and the receiving side optimizes the automa equalizer, etc., according to this signal.**
TCF (Training Check)	———————	**Sends 0 continuously for 1.5 seconds at the speed as the training signal.**
CFR (Confirmation to Receive)	**X0100001**	**Notifies the sending side that TCF has been properly received. If TCF is not properly rece FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiat training once again.**
Training 2	———————	**Used for reconfirming the receiving side like training 1.**
Image Signal	**Refer to the next page.**	———————
RTC (Return to Control)	———————	**Sends 12 bits (0...01 × 6 times) to the receive the same speed as the image signal and noti completion of transmission of the first sheet**
EOP (End of Procedure)	**X1110100**	**End of one communication**
MCF (Message Confirmation)	**X0110001**	**End of 1 page reception**
DCN (Disconnect)	**X1011111**	**Phase E starts.**
MPS (Multi-Page Signal)	**X1110010**	**Completion of transmission of 1 page. If ther still more documents to be sent, they are out instead of EOP. After MCF reception, the sen transmits an image signal of the second she**
PRI-EOP (Procedural Interrupt-EOP)	**X1111100**	**If there is an operator call from the sender, it output after RTC.**
PIP (Procedural Interrupt Positive)	**X0110101**	**This is output when an operator call is recei**

b. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.


(a) Document
Basic Facsimile Technique
(b) Part of document
Facsimile
(c) Run length and image signals equivalent to (b)
White
Black 4 2 4 2 8 3
15 12 16 18 13
(d) Codification of (c) according to MH formula
00110111101010 (White 400)
011 (Black 4)
110101 (White 15)
11 (Black 2)
001000 (White 12)
011 (Black 4)
101010 (White 16)
11 (Black 2)
0100111 (White 18)
000101 (Black 8)
000011 (White 13)
10 (Black 3)
(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

Modified Huffman (MH) Code

Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

5.6.2. MODEM CIRCUIT OPERATION

The ASIC (IC1) has all the hardware satisfying the ITU-T standards mentioned previously. / The modem is included in IC1. The signal communicates with the TEL line through the analog front end IC (IC5) of digital/analog, analog/digital convertor. The modem in IC1 is operated using the 20.736 MHz (x2) clock.

1. Facsimile Transmission/DTMF Line Send

The digital image data on the data bus is modulated in the modem (IC1), and sent to analog front end (IC5) as the digital data, then it is converted to the analog signal there. Passing through IC9 and IC6, the signal is sent to NCU section.

Refer to CHECK SHEET ()

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 15 of the analog front end (IC5). The signals that enter pin 15 of the analog front end (IC5) convert the analog signals to the digital signals, then the data is sent to the modem (IC1).

Refer to CHECK SHEET ()

3. DTMF Transmission

The DTMF signal generated in the ASIC (IC1) is sent to the analog front end (IC5) to perform the digital/analog conversion, then output from pin 3 of IC5, and is then sent to the circuit on the same route as used for facsimile transmission.

Refer to CHECK SHEET ()

4. Call Tone Transmission

This is the call signal which is generated in the ASIC (IC1) and sent to the speaker.

Refer to CHECK SHEET ()

5. Busy/Dial Tone Detection

The path is the same as FAX receiving.

5.7. ANALOG UNIT BLOCK DIAGRAM

5.8. NCU SECTION

5.8.1. GENERAL

This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL Line relay (RLY1), bell detection circuit, EXT TEL selection circuit, pulse dialing circuit, line amplifier, sidetone circuits and multiplexer.

5.8.2. LINE RELAY (RL1)

Circuit Operation

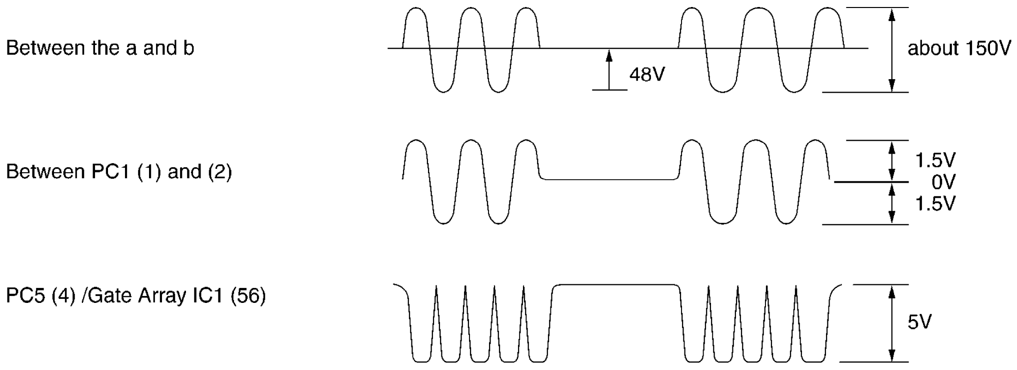
Normally, this relay switches to the external telephone side (Break) and switches to the open side (make) when the unit starts facsimile communication. Pulse dialing is also performed by ON /OFF of the relay.

[IC1 (99) High Level → CN9 (8)] → CN1(8) → Q3 ON → RL1 (make)

5.8.3. BELL DETECTION CIRCUIT

Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 19 of ASIC IC4 on the digital board is read.



TEL LINE → PC1 (1, 2 - 4) → CN1(6) → [CN9(6) → R119 → IC1(56)]

5.8.4. PULSE DIALING

[IC1 (99) High Level → CN9 (8)] → CN1 (8) → Q3 ON → PC1 ON (make)

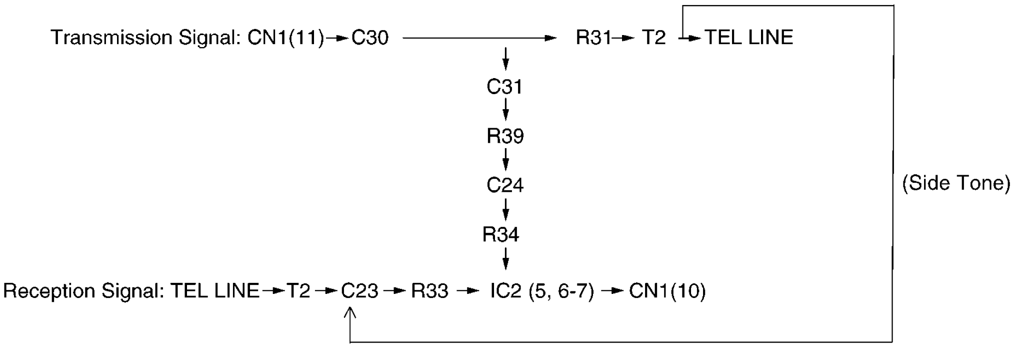
Refer to # 013 on the PROGRAM MODE TABLE ()

5.8.5. LINE AMPLIFIER AND SIDE TONE CIRCUITS

1. Circuit Operation

The reception signal received as output from line transformer T2 is given as input to C23, R33 and IC2 pin (6). / Then it is input to the reception system at an amplifier gain of 5.9 dB from pin (6). / The transmission signal is input from CN1 pin (11), and output to the TEL line through C30, R31 and T2. Without a side tone circuit,

the transmission signal would return to the reception amplifier via C30 and R31. Here, the signal output from CN1 pin (11) passes through C30, C36 and R39 and enters the amplifier IC2 pin (5). This is used to cancel the return portion of the transmission signal. This is the side tone circuit.


Transmission Signal: CN1(11)→C30 → R31→ T2 →TEL LINE
C31
R39
C24
R34
(Side Tone)
Reception Signal: TEL LINE→T2→C23→R33 → IC2 (5, 6-7) →CN1(10)

5.9. ITS (Integrated telephone System) and MONITOR SECTION

5.9.1. GENERAL

During the monitor operation, the speaker output passes through the power amplifier (IC1) [Analog board]. / The DTMF signal is output from the modem (IC1: digital board). The alarm tone, the key tone, bell tone, and beep are output from gate array IC1 (digital board). During a pulse dial operation, the monitor tone is output from gate array IC1.

5.9.2. MONITOR CIRCUIT

1. Function

   This is the function when you are not holding the handset and can hear the caller's voice from the line.

2. Circuit Operation

   (Monitor Signal Path)

   Signals received from the telephone line are output through at the speaker via the following path.

   Refer to CHECK SHEET ()

5.9.3. HANDSET CIRCUIT

1. Transmission signal

   Refer to 2.3.4.4. Analog Board Section

2. Reception Signal

   Refer to CHECK SHEET ()

5.9.4. MONITOR CIRCUIT

1. DTMF Monitor

(Monitor)
Refer to CHECK SHEET ()
(Handset)

2. Alarm/Beep/Key tone/Bell
Refer to CHECK SHEET ()

3. Dummy Ring Back Tone
Same with the modem signal transmission.

5.10. EXT. TEL

EXT. TEL JACK is provided for the external TEL connection. / Connect the telephone to the EXT. TEL JACK. Because the unit has the priority, EXT. TEL is disconnected when the unit is OFF-HOOK.

1. EXT. TEL DC LOOP
(Signal Path) / T → CN4(3) → POS1 → L2 → RL1(3-5) → L3 → CN5(4) → EXT.TEL → CN5(3) → L4 → R14 → L1 → CN4(4) → R

2. REMOTE RECEIVING
This is the parallel connection DTMF signal for the TEL or EXT. TEL mode between T and R. When the other party is a FAX, the unit changes to FAX receiving.
(Signal path)
Refer to CHECK SHEET ()

5.10.1. CIRCUIT DIAGRAM

5.11. OPERATION BOARD SECTION

The unit consists of an LCD (Liquid crystal display), KEYs, photo interrupters (sensor), and analog switches (for key scan). / The key scan (analog switch control, reading), sensor detection (sensor control, reading) and LCD control are all controlled by I/O of ASIC (IC1) on the digital board.

5.11.1. KEY SCAN

When CN1(8) (OPSEL) is "H", the analog switch (IC1) is available. The "KLATCH", "KSCLK" and "KTXD" control the analog switch (IC1) to read at KIN0~3.
Analog Switch (IC1) Control

	0	1	2	3	4	5	6	7
KLATCH (A)	L	H	L	H	L	H	L	H
KSCLK (B)	L	L	H	H	L	L	H	H
KTXD (C)	L	L	L	L	H	H	H	H

Key Matrix

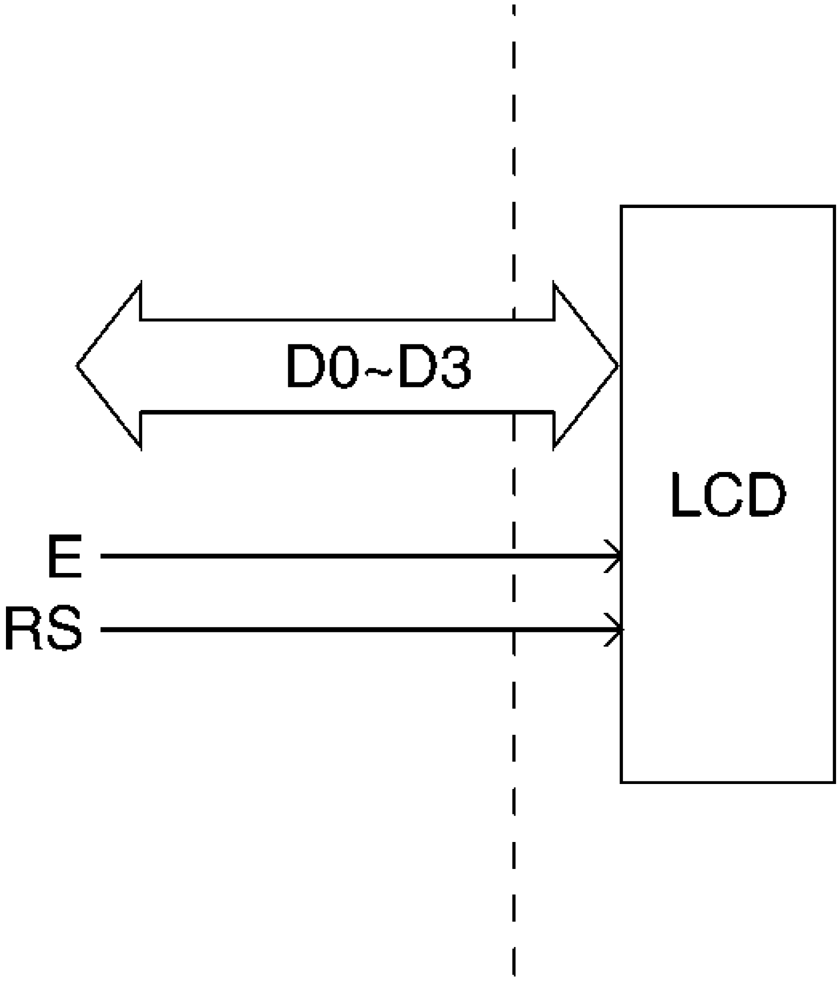
	0	1	2	3	4	5	6	7
KIN0		VOLUME HIGH (SW6)		RECEIVE MODE (SW7)				
KIN1	NEXT → (SW14)	MONITOR (SW13)	REDIAL/ PAUSE (SW12)	COPY (SW15)	0 (SW11)	2 (SW8)	8 (SW10)	5 (SW9)
KIN2	←PREV (SW22)	VOLUME LOW (SW21)	MUTE (SW20)	STOP (SW23)	# (SW19)	3 (SW16)	9 (SW18)	6 (SW17)
KIN3	HELP (SW30)	MENU (SW29)	FLASH (SW28)	FAX/ START/SET (SW31)	* (SW27)	1 (SW24)	7 (SW26)	4 (SW25)

5.11.2. SENSOR DETECTION

When CN1(8) (OPSEL) is "L", the detection of the document sensor and read start position sensor are available.

5.11.3. LCD CONTROL

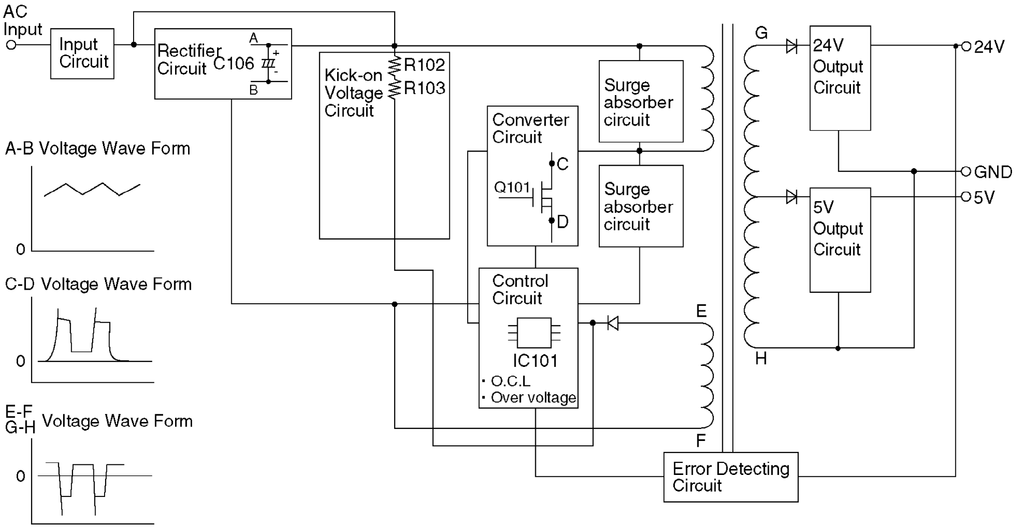
"KTXD", "KSCLK", "KLATCH" and "KSTART" are sent as D0~D3 to control the LCD.



5.12. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



AC Input
Input Circuit
Rectifier Circuit
C106
A
B
Kick-on Voltage Circuit
R102
R103
Converter Circuit
Q101
C
D
Surge absorber circuit
Surge absorber circuit
Control Circuit
IC101
• O.C.L
• Over voltage
E
F
G
H
24V Output Circuit
5V Output Circuit
24V
GND
5V
Error Detecting Circuit
A-B Voltage Wave Form
C-D Voltage Wave Form
E-F G-H Voltage Wave Form
0
0
0

[Input Circuit]

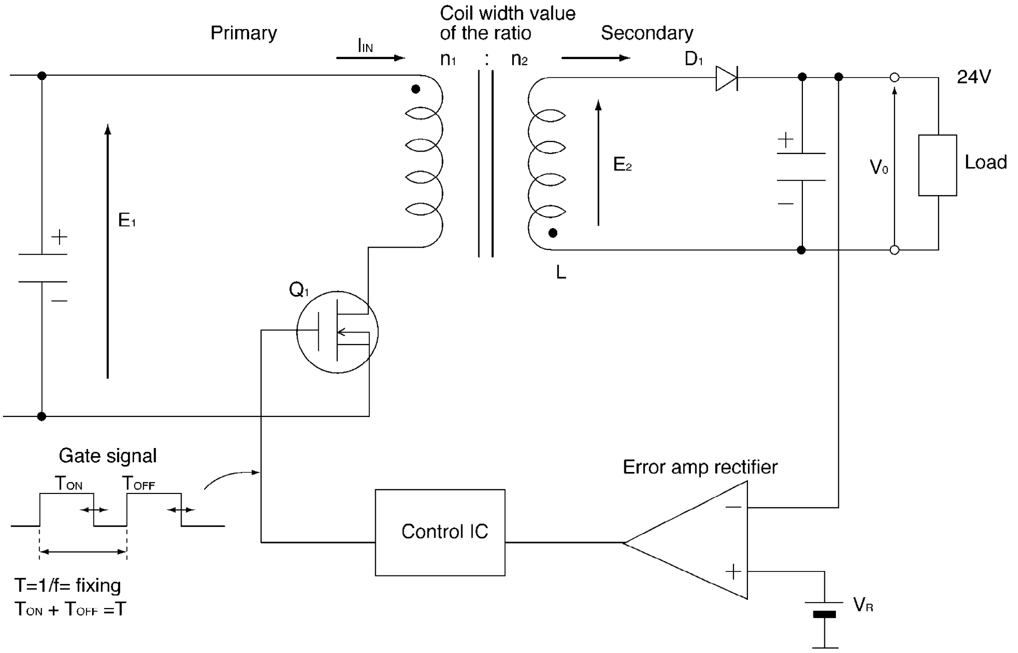
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



Primary
IIN
Coil width value of the ratio
n1 : n2
Secondary
D1
24V
E1
E2
V0
Load
L
Q1
Gate signal
TON
TOFF
T=1/f= fixing
TON + TOFF =T
Control IC
Error amp rectifier
VR

The following is an overview of how the power supply unit is controlled.

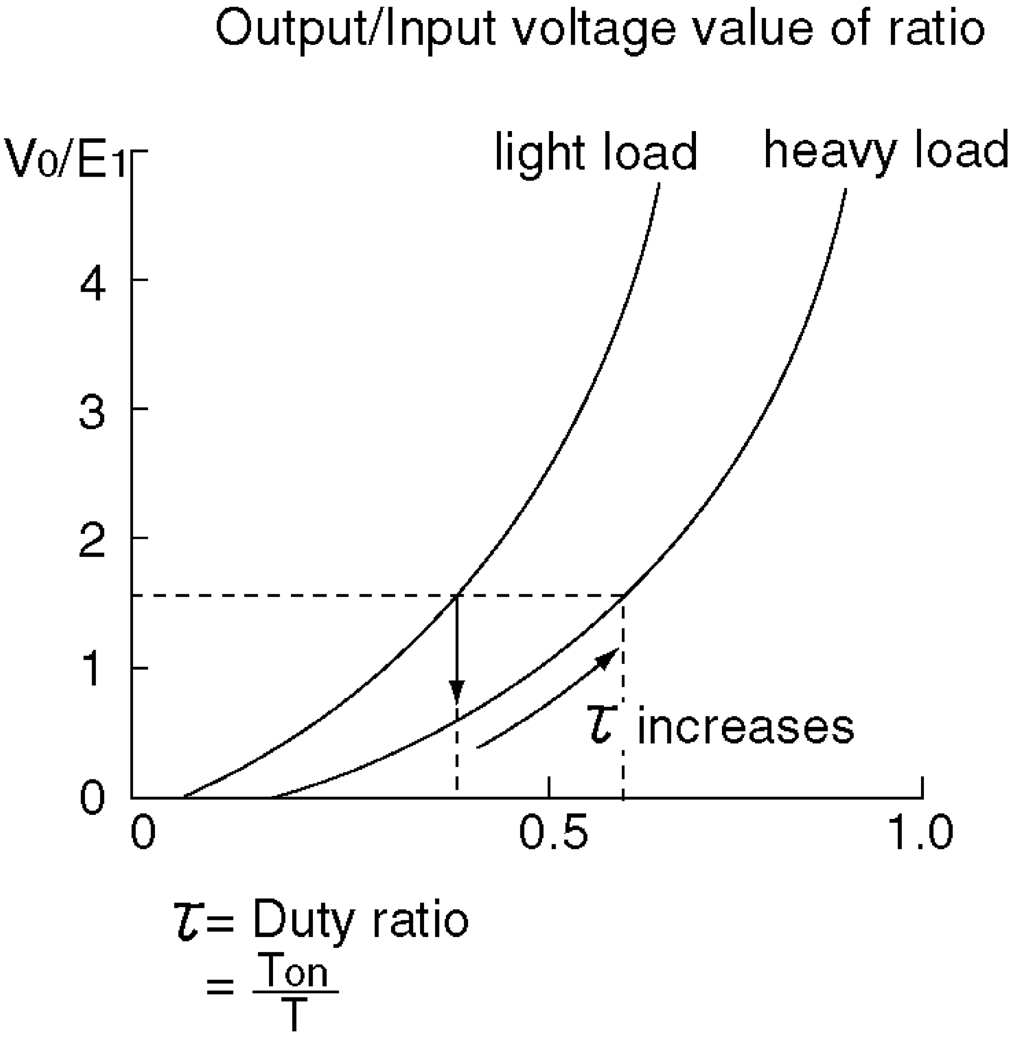
The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transformer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transformer as follows.

L → D_1 → Load → L

Then the power is supplied to the Load. When Q1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how TON is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.

Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is

limited by this circuit.

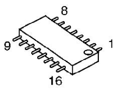
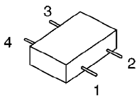
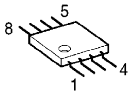
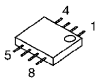
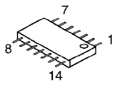
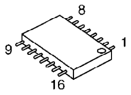
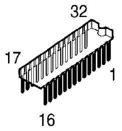
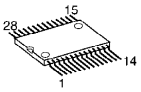
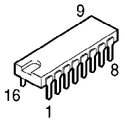
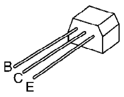
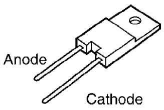
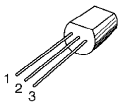
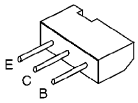
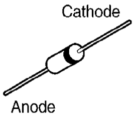
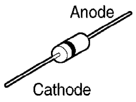
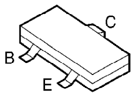
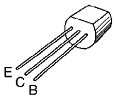
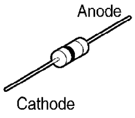
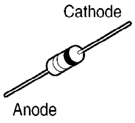
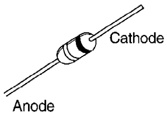
[Over Voltage Circuit]

If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

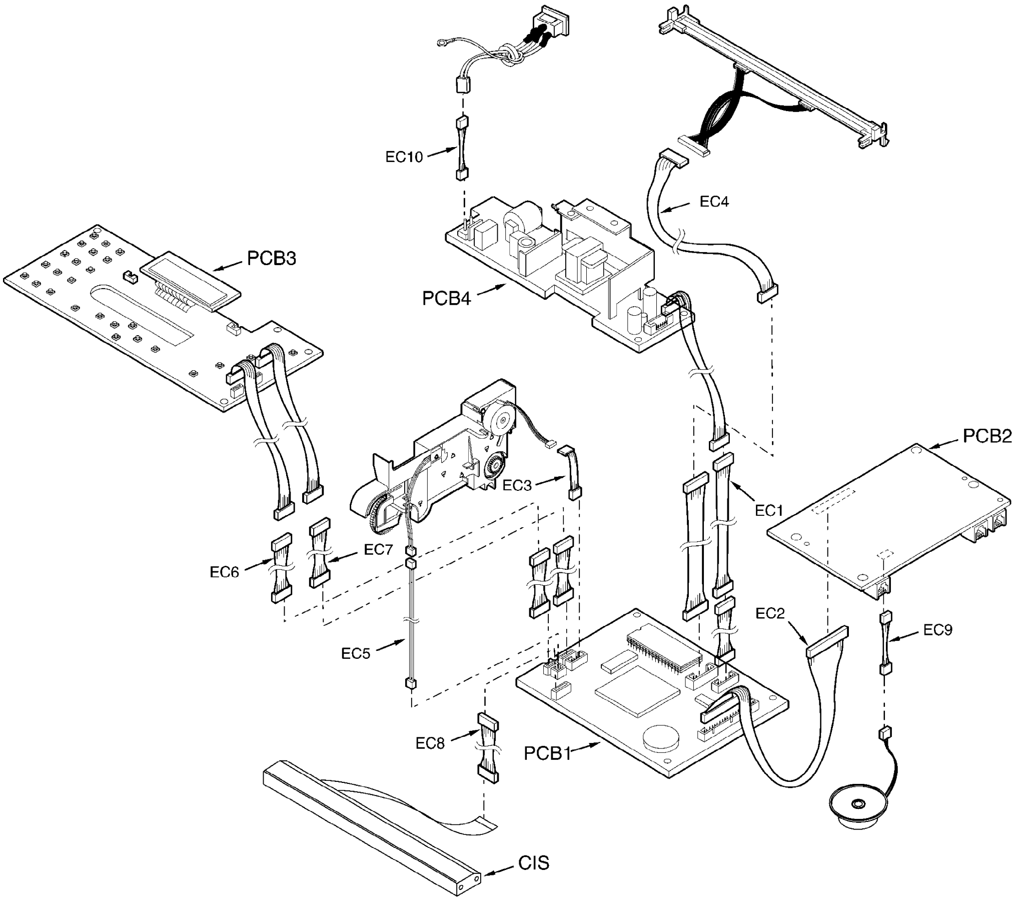
Dummy load method (to quickly check the power supply output)

Refer to POWER SUPPLY BOARD SECTION ()

6. TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

 PQVICM4051BF	 PFVIS80842AN	 PQVINJM4558M PQVIMC34119M PQVINJM2904F	 PFVTSI4431DY PFVIT7E05	 PQVITC4066BF
 PFDITC35133F	 PFWIFT71LA	 PQVICX58257C	 PFVIT2003APS	 2SC1741S 2SA933
 Anode Cathode PFVDSF5LC20U	 2SK2640 PFVITA7805F	 2SB1322	 Cathode Anode 1SS133	 Anode Cathode MA165,MA4020
 PQVTDTC114EU PQVTDTA143EU,PQVTDTC143E 2SB1197K,2SC4155R 2SB1218A, 2SD1819A		 2SC1740S	 Anode Cathode PFVD1N4005,MA4220 PFVDD1NL20U,MA7200	 Cathode Anode PFVDRMRLS245 MA4056
 PQVDRLS73T	 Cathode Anode MA2300,MA4030 MA4075M			

7. FIXTURES AND TOOLS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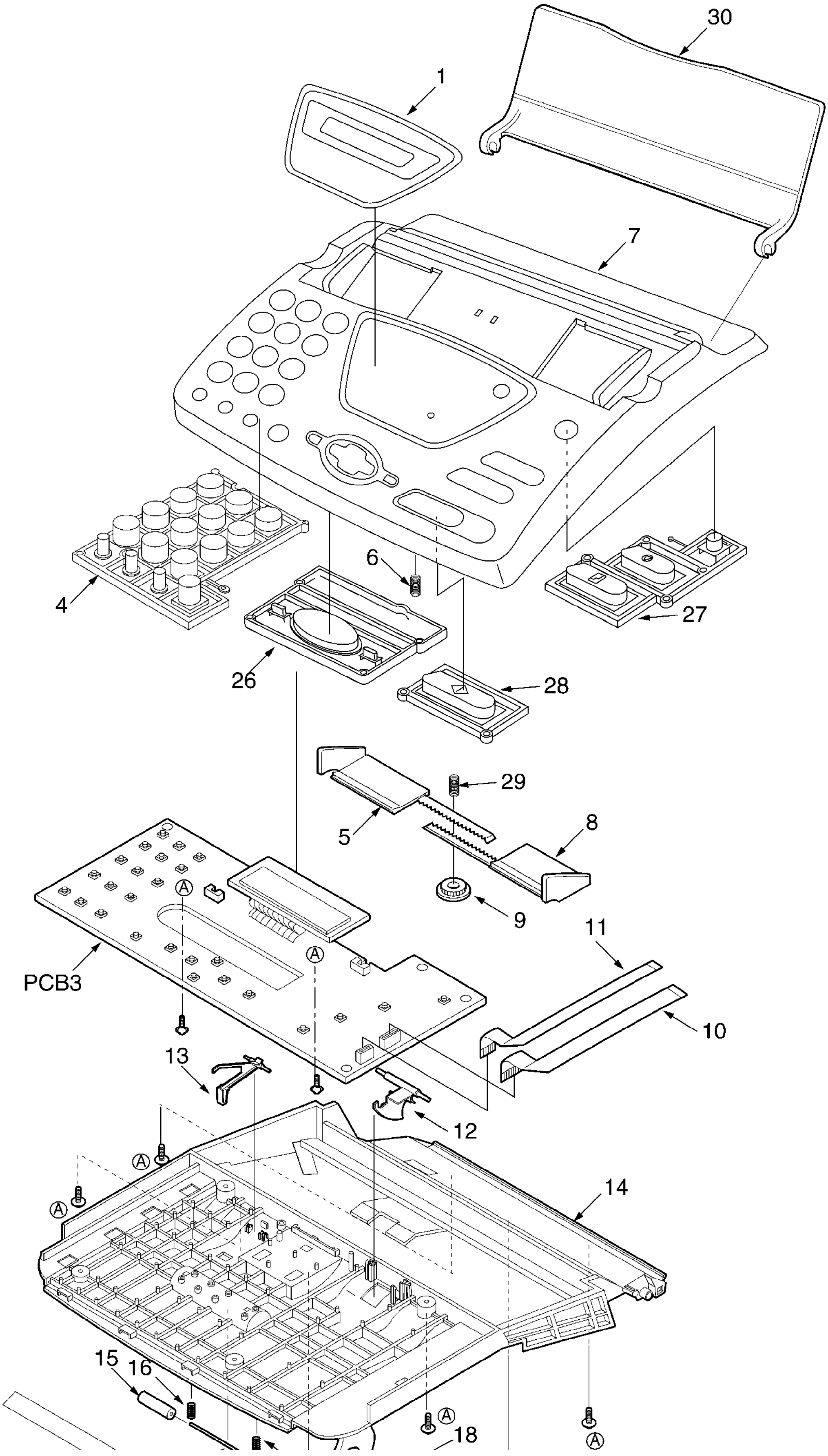
PCB3
PCB4
PCB2
EC3
EC1
EC7
EC6
EC2
EC9
EC5
EC8
PCB1
CIS

8. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

8.1. OPERATION PANEL SECTION


PCB3
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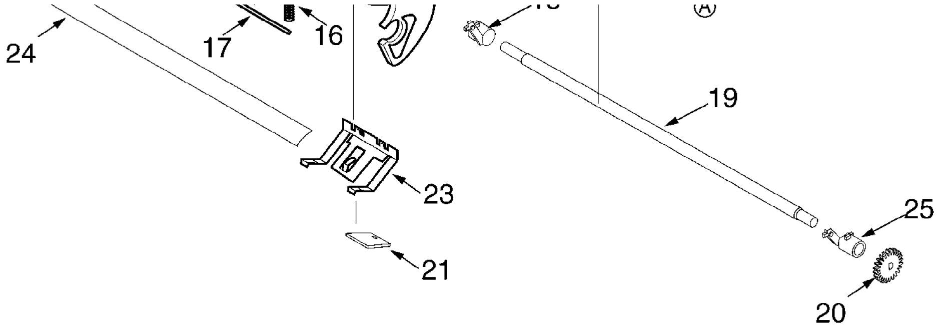
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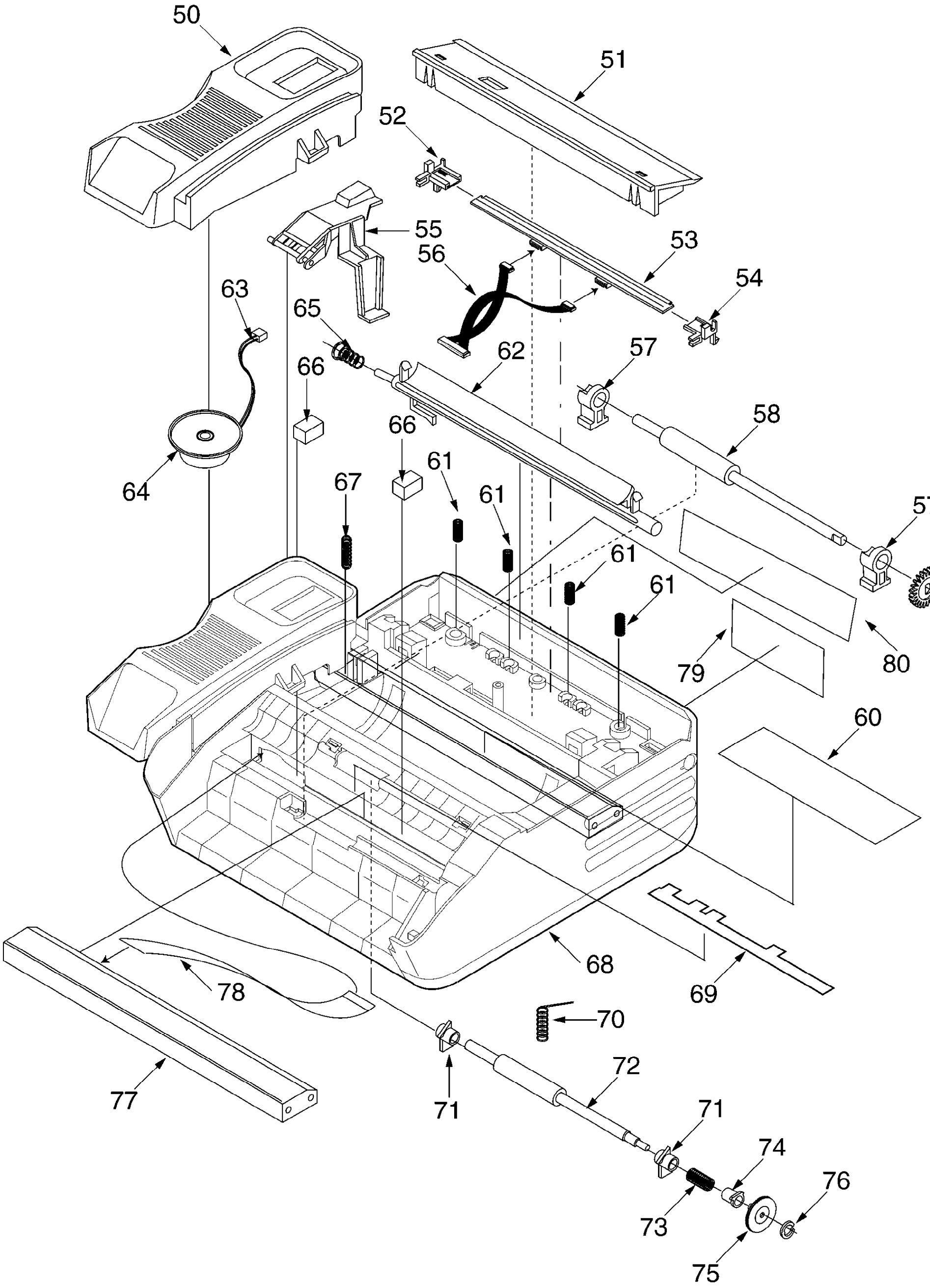
8.2. UPPER CABINET SECTION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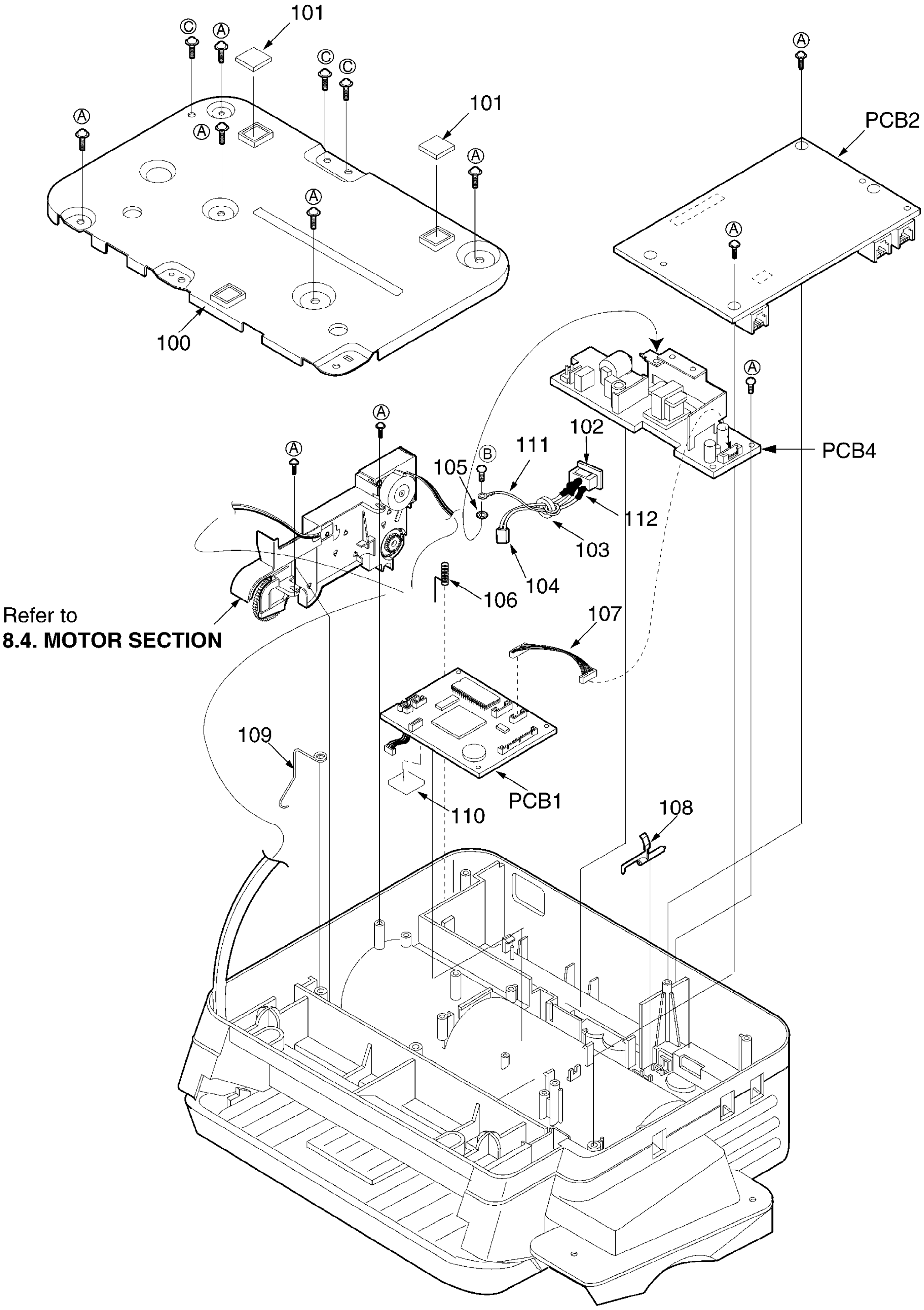
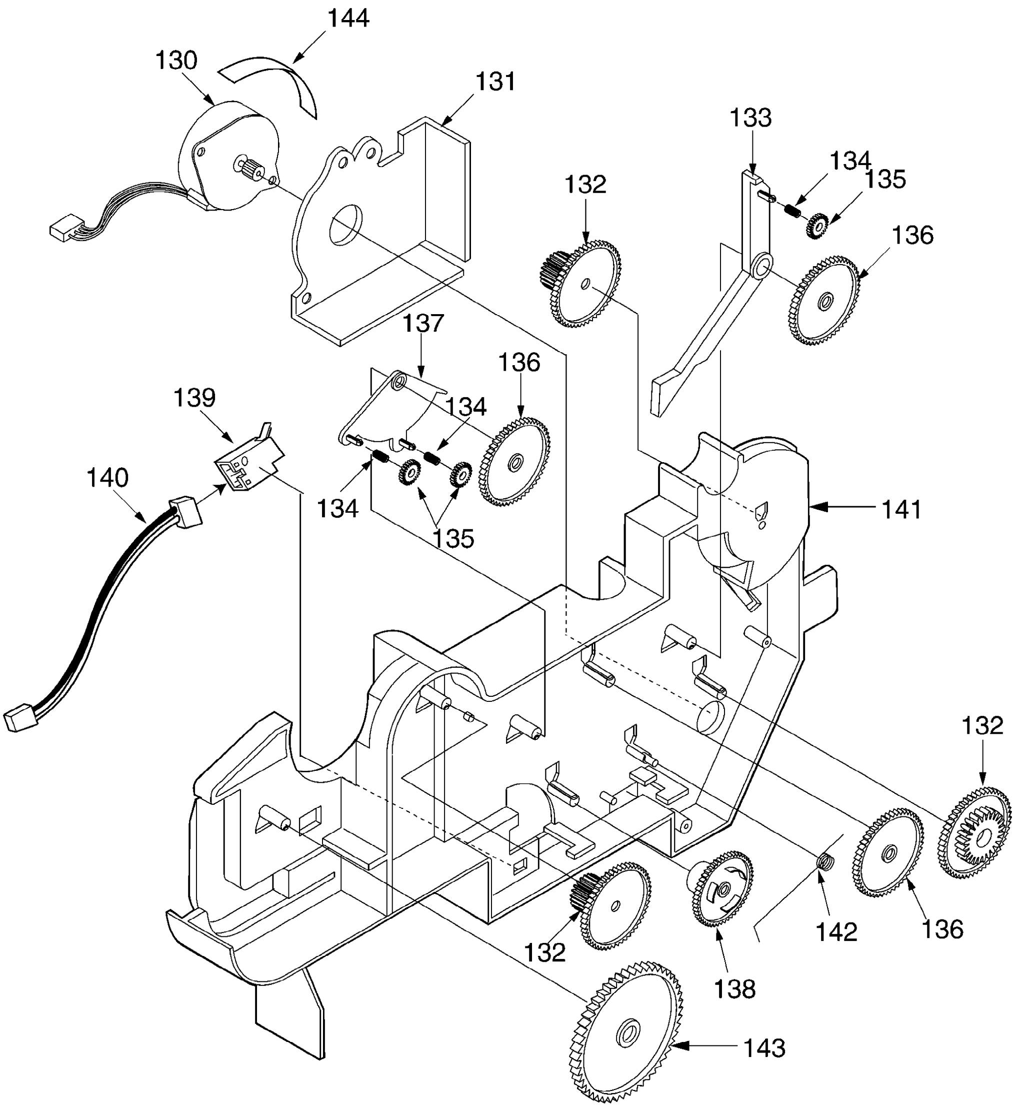
8.3. LOWER CABINET/P.C.B. SECTION


101
Ⓒ
Ⓐ
Ⓒ
Ⓒ
101
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Ⓐ
PCB2
Ⓐ
100
Ⓐ
Ⓐ
102
PCB4
Ⓐ
111
105
Ⓑ
112
103
104
106
107
Refer to
8.4. MOTOR SECTION
109
PCB1
110
108

CROSS REFFERENCE:

MOTOR SECTION ()

8.4. MOTOR SECTION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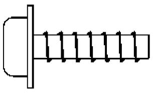
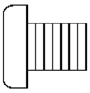
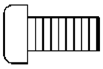
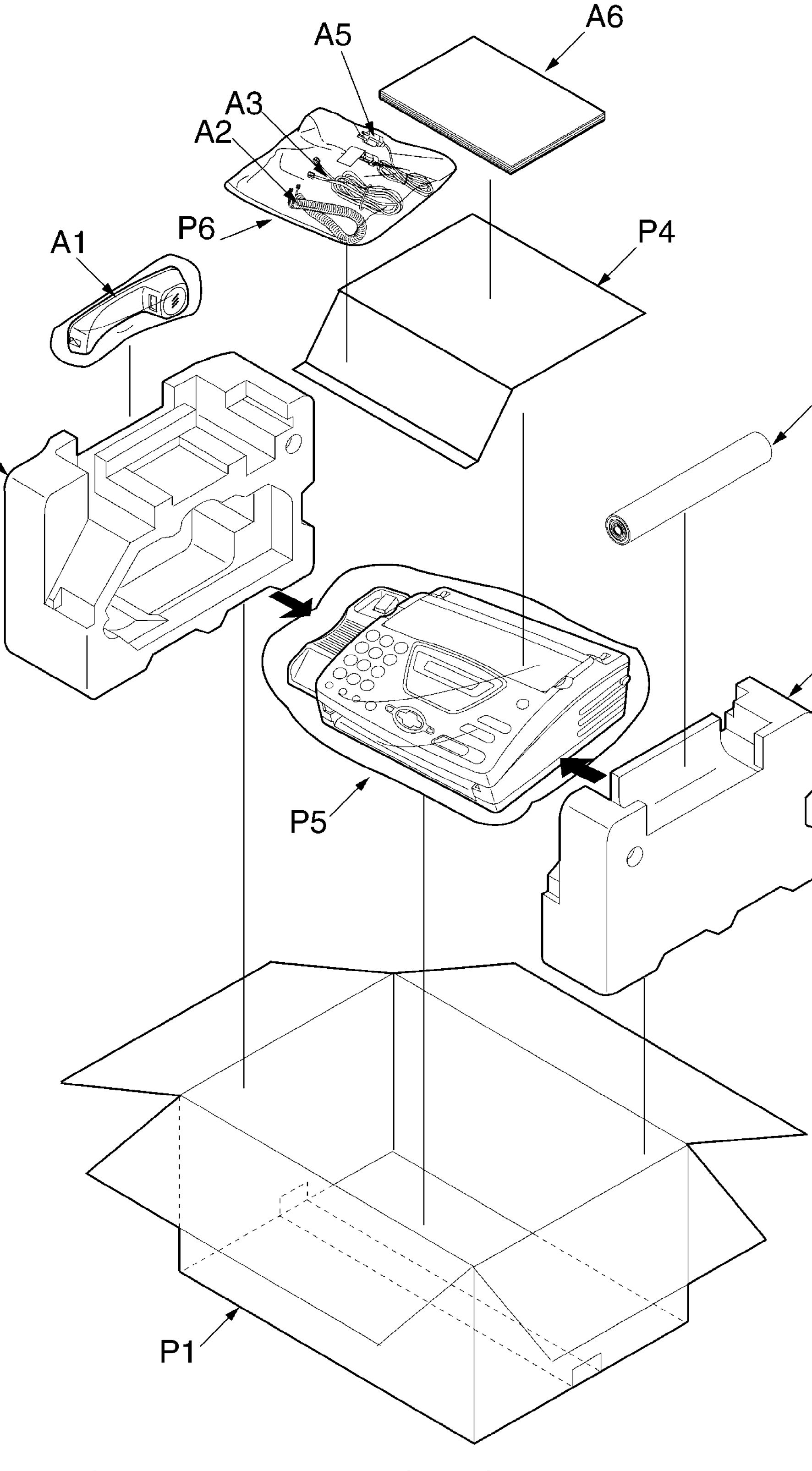
8.5. ACTUAL SIZE OF SCREWS

	Part No.	Illustration
Ⓐ	XTW3 + S10P	
Ⓑ	XSB4 + 6	
Ⓒ	XSN3 + W6FZ	

9. ACCESSORIES AND PACKING MATERIALS


A5
A6
A3
A2
P6
A1
P4
A7
P2
P3
P5
P1

10. REPLACEMENT PARTS LIST

Notes:

1. **The marking (RTL) indicates that the Retention Time is limited for this item.**
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
   After the end of this period, the assembly will no longer be available.
2. **Important safety notice / Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.**
3. **The S mark indicates service standard parts and may differ from production parts.**
4. **RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor**

Type

ERC:Solid	ERX:Metal Film	PQRD:Carbon
ERD:Carbon	ERG:Metal Oxide	PQRQ:Fuse
PQ4R:Chip	ERO:Metal Film	ERF:Wire Wound

Wattege

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor	ECCD,ECKD,PQCBC,PQVP : Ceramic
ECQS:Styrol	ECQM,ECQV,ECQE,ECQU,ECQB : Polyester
PQCBX,ECUV:Chip	ECEA,ECSZ,ECOS : Electrolytic
ECMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V	05 : 50V	OF : 3.15V	OJ : 6.3V	1V : 35V
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V
2H : 500V		OJ : 6.3V	1E,25 : 25V	2A : 100V

10.1. CABINET AND ELECTRICAL PARTS

10.1.1. OPERATION PANEL SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFGP1213Z	PANEL, LCD	
2	Not Used		
3	Not Used		
4	PFBX1171Z1	PUSH BUTTON, DIAL	S
5	PFKR1025Z1	GUIDE, DOCUMENT (LEFT)	S
6	PFUS1170Z	TORSION SPRING, DOCUMENT LEVER	
7	PFGG1172Z1	GRILLE, OPERATION PANEL	S
8	PFKR1026Z1	GUIDE, DOCUMENT (RIGHT)	S
9	PFDG1015Y	GEAR, DOCUMENT GUIDE	
10	PFJE1029Z	LEAD WIRE	
11	PFJE1006Z	LEAD WIRE	
12	PFDE1096Z	LEVER, DOCUMENT DETECTION	
13	PFDE1100Z	LEVER, READ DETECTION	
14	PFUV1052Y	COVER, OPERATION	
15	PQDR9685Y	ROLLER, SUPPORT	
16	PFUS1171Z	TORSION SPRING, ROLLER	
17	PFDF1017Z	SHAFT	
18	PFDJ1020Z	SPACER, PLATEN (LEFT)	
19	PFDN1033Z	ROLLER, PLATEN	
20	PFDG1123Z	GEAR, PLATEN	
21	PFHG1064Z	RUBBER PARTS, SEPARATION	
22	Not Used		
23	PFUS1173Z	TORSION SPRING, DOCUMENT FEED	
24	PFHX1251Z	PLASTIC PARTS, READING SHEET	
25	PFDJ1021Z	SPACER, PLATEN (RIHGT)	
26	PFBX1172Z1	PUSH BUTTON, FUNCTION NAVI	S
27	PFBX1173Z1	PUSH BUTTON, COPY/STOP	S
28	PFBC1094Z1	PUSH BUTTON, START	S
29	PFUS1222Z	SPRING, SLIDER	
30	PFKS1070Z1	TRAY, DOCUMENT	

10.1.2. UPPER CABINET/THERMAL HEAD SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
50	PFKM1049Z1	CABINET BODY, HANDSET CRADLE	S
51	PFHR1132Z	COVER, HEAD	
52	PFDE1180Z	GUIDE, HEAD (LEFT)	
53	PFJHS026Z	PRINTER UNITS, THERMAL HEAD	
54	PFDE1181Z	GUIDE, HEAD (RIGHT)	
55	PFBH1011Z1	PUSH BUTTON, HOOK	S
56	PFJS11Q45Z	CONNECTOR, 11 PIN	
57	PFDJ1018Z	COVER, ROLLER HOLDER	
58	PFDN1032Z	ROLLER, DOCUMENT FEED	
59	PFDG1122Z	GEAR, EXIT ROLLER	
60	PFQT1908Z	INDICATION LABEL, PAPER CAUTION	
61	PFUS1172Y	TORSION SPRING, THERMAL HEAD	
62	PFDE1102Z1	LEVER, LOCK	S
63	PFJS02Q42Z	CONNECTOR, 2 PIN	
64	PFAS50P006Z	SPEAKER	
65	PFUS1179Z	TORSION SPRING, LOCK LEVER	
66	PFHE1019Z	INSULATOR, IMAGE SENSOR FORM	
67	PFUS1176Z	TORSION SPRING, OPERATION PANEL OPEN	
68	PFKM1048T1	CABINET BODY, MAIN	S
69	PFHX1268Y	PLASTIC PARTS, IMAGE SENSOR SHEET	
70	PFUS1181Z	TORSION SPRING, HEAD EARTH	
71	PFDJ1013Y	SPACER, ROLLER	
72	PFDN1034Z	ROLLER, SEPARATION	
73	PQUS10055Z	SPRING, ONE WAY	S
74	PFDE1059Z	SPACER, DELAY	
75	PFDG1124Z	GEAR, SEPARATION ROLLER	
76	XUC2FY	RETAINING RING	
77	N2GBBE000001	PHOTO ELECTRIC TRANSDUCER, IMAGE SENSOR	S
78	PFJE1005Z	LEAD WIRE, IMAGE SENSOR	
79	PFGT1922Z-M	NAME PLATE	
80	PFQT1186Y	INDICATION LABEL, CAUTION	

10.1.3. LOWER SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
100	PFMD1039Y	FRAME, BOTTOM	
101	PFHA1001Z	RUBBER PARTS, LEGS	
102	PFJP03S04Z	CONNECTOR, 3 PIN	⚠
103	PQLB1E1	INSULATOR, FERRITE CORE	
104	PQJS02Q59Y	CONNECTOR, 2 PIN	
105	XWC4B	WASHER	
106	PFUS1177Z	TORSION SPRING, EARTH	
107	PFJS08R44Z	CONNECTOR, 8 PIN	
108	PFDE1097Z	LEVER, PAPER SENSOR	
109	PFUS1214Z	TORSION SPRING, ROLLER EARTH	
110	PFHX1555Z	PLASTIC PARTS, DIGITAL UNIT	
111	XK20C-M4-HW	EARTH LEAD	
112	PQMX10010Z	SUMI TUBE	

10.1.4. GEAR CHASSIS SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFJQ1015Z	DC MOTOR	
131	PFMH1069Z	CHASSIS, MOTOR PLATE	
132	PFDG1119Y	GEAR, IDLER A	
133	PFDE1095Z	ARM, RX	
134	PFUS1062Z	COIL SPRING, GEAR C	
135	PFDG1021Z	GEAR, CAM	
136	PFDG1022Z	GEAR, D	
137	PFDE1094Z	ARM, TX	
138	PFDG1121Z	GEAR, CAM	
139	PQST2A04Z	SEESAW SWITCH, CAM SENSOR	
140	PFJS03Q43Z	CONNECTOR, 3 PIN	
141	PFUA1022Z	CHASSIS, GEAR	
142	PFUS1169Z	TORSION SPRING, ARM	
143	PFDG1120Z	GEAR, IDLER B	
144	PFHX1399Z	COVER, MOTOR SHEET	

10.1.5. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJXE0801Z	HANDSET	
A2	PFJA1029Y	CORD, HANDSET	
A3	PQJA10075Z	CORD, TELEPHONE	
A4	Not Used		
A5	PFJA1030Z	POWER CORD	⚠
A6	PFQX1629Z	INSTRUCTION BOOK	
A7	PQPH10023Z	SHEET RECORDING PAPER (10M)	
P1	PFPE1229Z-M	GIFT BOX ASS'Y	
P2	PFPD1270Z	CUSHION, PAD (LEFT)	
P3	PFPN1271Z	CUSHION, PAD (RIGHT)	
P4	PFPD1089Y	CUSHION, UPPER	
P5	PQPH79Z	PROTECTION COVER	
P6	PQPP10005Z	PROTECTION COVER	

10.2. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FT71LA	DIGITAL BOARD ASS`Y (RTL)	
		(ICs)	
IC1	PFVIT7E05A	IC	S
IC2	PFWIFT71LA	IC (ROM)	
IC3	PQVICX58257C	IC	S
IC4	PFVIS80842AN	IC	S
IC5	PFVITC35133F	IC	S
IC6	PQVITC4066BF	IC	S
IC7	PFVIT2003APS	IC	S
IC8	PQVINJM4558M	IC	S
IC9	PQVINJM4558M	IC	S
		(TRANSISTORS)	
Q1	2SB1197K	TRANSISTOR(SI)	S
Q2	2SA933	TRANSISTOR(SI)	S
Q3	2SC4155R	TRANSISTOR(SI)	S
Q4	2SC4155R	TRANSISTOR(SI)	S
Q6	PQVTDTC114EU	TRANSISTOR(SI)	S
Q7	2SB1322	TRANSISTOR(SI)	S
Q8	PQVTDTC114EU	TRANSISTOR(SI)	S
Q9	2SB1218A	TRANSISTOR(SI)	
Q10	2SC4155R	TRANSISTOR(SI)	S
Q11	2SC4155R	TRANSISTOR(SI)	S
Q13	PFVTSI4431DY	TRANSISTOR(SI)	S
Q14	PQVTDTC143E	TRANSISTOR(SI)	S
Q15	PQVTDTC114EU	TRANSISTOR(SI)	S
Q16	PQVTDTC114EU	TRANSISTOR(SI)	S
Q17	2SB1218A	TRANSISTOR(SI)	
		(DIODES)	
D1	PQVDRLS73T	DIODE(SI)	
D2	PFVDRMRLS245	DIODE(SI)	S
D3	MA7200	DIODE(SI)	
D7	PQVDRLS73T	DIODE(SI)	
		(BATTERY)	
BAT1	PFSU1004Z	BATTERY	S
		(CONNECTORS)	
CN1	PQJP8G30Y	CONNECTOR	S
CN3	PQJP5G30Y	CONNECTOR	S
CN4	PQJP11G100Z	CONNECTOR	
CN5	PQJP2G30Y	CONNECTOR	S
CN6	PFJS06A13Z	CONNECTOR	S
CN7	PFJS09A13Z	CONNECTOR	
CN8	PFJS10A13Z	CONNECTOR	S
CN9	PQJP17A19Z	CONNECTOR	S
		(CERAMIC FILTERS)	
L1	PFVF1A121ST	CERAMIC FILTER	
L2	PFVF1A121ST	CERAMIC FILTER	
		(FUSES)	

Ref. No.	Part No.	Part Name & Description	Remarks
F2	PFRB001251KC	FUSE	S
F3	PFRB0031125T	FUSE RESISTOR	S
F4	PFRB001251KC	FUSE	S
		(COILS)	
L18	PQLQR1RS102	COIL	S
		(COMPONENTS PARTS)	
RA1	PFXBV8V151JV	COMPONENTS PARTS	S
RA2	PFXBV8V151JV	COMPONENTS PARTS	S
RA3	PFXBV8V151JV	COMPONENTS PARTS	S
RA4	PFXBV8V151JV	COMPONENTS PARTS	S
RA5	PFXBV8V151JV	COMPONENTS PARTS	S
		(CRYSTAL OSCILLATORS)	
X1	PFVCCFS32Z	CRYSTAL OSCILLATOR	S
X2	PFVC2073FZAT	CRYSTAL OSCILLATOR	S
X3	PFVBKB240ZAT	CRYSTAL OSCILLATOR	S
		(RESISTORS)	
F1	ERDS1VJ000	0	S
J11	ERJ3GEY0R00	0	
J13	PQCUV1H104ZF	0.1	S
L4	ERJ3GEY0R00	0	
L5	ERJ3GEYJ101	0	
L6	ERJ3GEYJ101	0	
L7	ERJ3GEYJ101	0	
L8	ERJ3GEY0R00	0	
L9	ERJ3GEY0R00	0	
L10	ERJ3GEY0R00	0	
L11	ERJ3GEY0R00	0	
L12	ERJ3GEY0R00	0	
L13	ERJ3GEY0R00	0	
L14	ERJ3GEY0R00	0	
L15	ERJ3GEY0R00	0	
L17	ERJ3GEY0R00	0	
L19	ERJ3GEY0R00	0	
L20	ERJ3GEY0R00	0	
L22	ERJ3GEY0R00	0	
L25	ERJ3GEY0R00	0	
R1	ERJ3GEYJ473	47k	
R2	ERJ3GEY0R00	0	
R6	ERJ3GEY0R00	0	
R7	ERJ3GEYJ103	10k	
R8	ERJ3GEYJ472	4.7k	
R9	ERJ3GEYJ472	4.7k	
R10	ERJ3GEYJ151	150	
R11	ERJ3GEYJ151	150	
R12	ERJ3GEYJ151	150	
R13	ERJ3GEYJ102	1k	
R14	ERJ3GEYJ222	2.2k	
R17	ERJ3GEYJ103	10k	
R18	ERJ3GEYJ222	2.2k	

Ref. No.	Part No.	Part Name & Description	Remarks
R19	ERJ3GEYJ122	1.2k	
R20	ERJ3GEYJ821	820	
R21	ERJ3GEYJ472	4.7k	
R22	ERJ3GEYJ912	9.1k	
R24	ERJ3GEYJ103	10k	
R25	ERJ3GEYJ103	10k	
R26	ERJ3GEYJ331	330	
R27	ERJ3GEYJ104	100k	
R28	ERJ3GEYJ124	120k	
R29	ERJ3GEYJ105	1M	
R30	ERJ3GEY0R00	0	
R32	ERJ3GEYJ103	10k	
R33	ERJ3GEYJ102	1k	
R34	ERJ3GEYJ105	1M	
R35	ERJ3GEYJ563	56k	
R36	ERJ3GEYJ103	10k	
R37	ERJ3GEYJ243	24k	
R38	ERJ3GEYJ243	24k	
R39	ERJ3GEYJ753	75k	
R40	ERJ3GEYJ473	47k	
R42	ERJ3GEYJ433	43k	
R43	ERJ3GEYJ224	220k	
R44	ERJ3GEYJ395	3.9M	
R46	ERJ3GEYJ123	12k	
R49	ERJ3GEYJ683	68k	
R51	ERJ3GEYJ103	10k	
R52	ERJ3GEYJ224	220k	
R53	ERJ3GEYJ104	100k	
R54	ERJ3GEYJ105	1M	
R57	ERJ3GEYJ103	10k	
R58	ERJ3GEYJ472	4.7k	
R59	ERJ3GEYJ394	390k	
R60	ERJ3GEYJ562	5.6k	
R62	ERJ3GEYJ393	39k	
R63	ERJ3GEYJ821	820	
R64	ERDS1TJ222	2.2k	S
R66	ERJ3GEYJ563	56k	
R67	ERJ3GEY0R00	0	
R68	ERJ3GEY0R00	0	
R69	ERJ3GEYJ101	100	
R70	ERJ3GEYJ101	100	
R71	ERJ3GEYJ101	100	
R72	ERJ3GEYJ153	15k	
R73	ERJ3GEYJ203	20k	
R74	ERJ3GEYJ562	5.6k	
R75	ERJ3GEYJ472	4.7k	
R77	ERJ3GEYJ472	4.7k	
R78	ERJ3GEYJ102	1k	
R80	ERJ3GEYJ151	150	
R81	ERJ3GEYJ470	47	
R82	ERJ3GEYJ6R8	6.8	
R85	ERJ3GEYJ222	2.2k	
R86	ERJ3GEYJ472	4.7k	
R87	ERJ3GEYJ224	220k	

Ref. No.	Part No.	Part Name & Description	Remarks
R88	ERJ3GEYJ224	220k	
R89	ERJ3GEYJ103	10k	
R90	ERJ3GEYJ224	220k	
R91	ERJ3GEYJ224	220k	
R92	ERJ3GEYJ222	2.2k	
R93	ERJ3GEYJ473	47k	
R98	ERJ3GEYJ102	1k	
R99	ERJ3GEY0R00	0	
R102	ERJ3GEYJ821	820	
R103	ERJ3GEYJ821	820	
R104	ERJ3GEYJ821	820	
R107	ERJ3GEYJ102	1k	
R108	ERJ3GEYJ102	1k	
R109	ERJ3GEYJ102	1k	
R110	ERJ3GEYJ102	1k	
R112	ERJ3GEYJ101	100	
R113	ERJ3GEYJ102	1k	
R116	ERJ3GEYJ101	100	
R117	ERJ3GEYJ102	1k	
R119	ERJ3GEYJ101	100	
R120	ERJ3GEYJ102	1k	
R121	ERJ3GEYJ102	1k	
R131	ERJ3GEYJ682	6.8k	
R132	ERJ3GEYJ224	220k	
R133	ERJ3GEYJ222	2.2k	
R134	ERJ3GEYJ471	470	
R135	ERJ3GEYJ151	150	
		(CAPACITORS)	
C1	ECUV1E104ZFV	0.1	
C2	ECUV1E104ZFV	0.1	
C3	ECUV1E104ZFV	0.1	
C4	ECUV1C104KBV	0.1	
C6	ECUV1E104ZFV	0.1	
C8	ECUV1E104ZFV	0.1	
C10	ECUV1E104ZFV	0.1	
C11	ECUV1E104ZFV	0.1	
C12	ECUV1E104ZFV	0.1	
C13	ECUV1H150JCV	15P	
C14	ECUV1H120JCV	12P	
C15	ECUV1H102KBV	0.001	
C17	ECUV1E104ZFV	0.1	
C18	ECUV1H102KBV	0.001	
C20	ECUV1E104ZFV	0.1	
C21	ECUV1E104ZFV	0.1	
C23	ECUV1E104ZFV	0.1	
C24	ECEA1CK101	100	S
C26	ECUV1E104ZFV	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1E104ZFV	0.1	
C30	ECUV1E104ZFV	0.1	
C31	ECUV1E104ZFV	0.1	
C32	ECUV1E104ZFV	0.1	
C33	ECUV1C224ZFV	0.22	S

Ref. No.	Part No.	Part Name & Description	Remarks
C34	ECEA1CK101	100	S
C35	ECUV1E104ZFV	0.1	
C36	ECEA1CK101	100	S
C37	PQCUV1H104ZF	0.1	S
C38	ECUV1H221JCV	220P	
C39	ECUV1H150JCV	15P	
C40	ECEA1HKS100	10	S
C41	ECUV1E104ZFV	0.1	
C42	ECUV1H102KBV	0.001	
C43	ECUV1C104KBV	0.1	
C44	ECUV1H220JCV	22P	
C45	ECUV1C104KBV	0.1	
C46	ECUV1E104ZFV	0.1	
C47	ECUV1H220JCV	22P	
C48	ECUV1C104KBV	0.1	
C49	ECUV1H220JCV	22P	
C50	ECUV1H222KBV	0.0022	
C51	ECUV1H221JCV	220P	
C52	ECUV1C104KBV	0.1	
C53	ECUV1C104KBV	0.1	
C54	ECUV1H222KBV	0.0022	
C55	ECUV1E104ZFV	0.1	
C56	ECUV1H182KBV	0.0018	
C58	ECUV1C104KBV	0.1	
C60	ECUV1C104KBV	0.1	
C61	ECUV1H151JCV	150P	
C62	ECUV1C104KBV	0.1	
C63	ECUV1C104KBV	0.1	
C64	ECUV1H101JCV	100P	
C65	ECUV1C104KBV	0.1	
C66	ECUV1C104KBV	0.1	
C67	ECUV1C104KBV	0.1	
C74	ECUV1H222KBV	0.0022	
C75	ECUV1H561JCV	560P	S
C77	ECUV1C104KBV	0.1	
C78	ECUV1H102KBV	0.001	
C79	ECEA1CK101	100	S
C80	ECUV1E104ZFV	0.1	
C82	PQCUV1H104ZF	0.1	S
C83	ECUV1E104ZFV	0.1	
C85	ECEA1VKS100	10	S
C90	ECUV1E104ZFV	0.1	
C91	ECUV1E104ZFV	0.1	
C92	ECUV1E104ZFV	0.1	
C94	ECUV1C224ZFV	0.22	S
C95	ECUV1H181JCV	180P	

10.3. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1398LAZ	ANALOG BOARD ASS`Y (RTL)	
		(ICs)	
IC1	PQVIMC34119D	IC	S
IC2	PQVINJM2904F	IC	S
		(TRANSISTORS)	
Q2	2SD1819A	TRANSISTOR(SI)	S
Q3	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIODES)	
D6	1SS133	DIODE(SI)	S
D8	1SS133	DIODE(SI)	S
D9	1SS133	DIODE(SI)	S
D11	MA4056	DIODE(SI)	
D12	MA4056	DIODE(SI)	
D13	MA4020	DIODE(SI)	S
D14	MA4020	DIODE(SI)	S
		(CONNECTORS AND JACKS)	
CN1	PQJS17A10Z	CONNECTOR,17PIN	S
CN2	PQJP02G100Z	CONNECTOR,2PIN	
CN3	PQJJ1TB18Z	JACK	S
CN4	PQJJ1T004Z	JACK	S
CN5	PQJJ1T004Z	JACK	S
		(RELAY)	
RL1	PFSL001Z	RELAY	S ⚠
		(VARISTORS)	
SA1	PQVDDSS301L	VARISTOR	S ⚠
SA2	PFRZ002Z	VARISTOR	S
		(SWITCHES)	
SW1	PFSH1A03Z	PUSH SWITCH	S
SW2	ESE14A211	PUSH SWITCH	
		(TRANSFORMER)	
T2	G4A1A0000160	TRANSFORMER	
		(COILS)	
L5	PQLQR1RS102	COIL	S
L8	PQLQR1RS102	COIL	S
		(PHOTO ELECTRIC TRANSDUCER)	
PC1	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	S
		(THERMISTOR)	
POS1	PQRPAR390N	THERMISTOR	S
		(RESISTORS)	
L1	PQ4R10XJ000	0	S
L2	PQ4R10XJ000	0	S
L3	PQ4R10XJ000	0	S

[illegible]	[illegible]	[illegible]	[illegible]

Ref. No.	Part No.	Part Name & Description	Remarks
L4	PQ4R10XJ000	0	S
L6	ERJ3GEY0R00	0	
L7	ERJ3GEY0R00	0	
R1	ERJ3GEYJ101	100	
R2	ERJ3GEYJ472	4.7k	
R3	ERJ3GEYJ101	100	
R4	ERJ3GEYJ472	4.7k	
R12	ERG2SJ121	120	
R14	ERDS2TJ221	220	S
R16	ERDS1TJ473	47k	S
R17	ERDS1TJ103	10k	S
R18	ERJ3GEYJ333	33k	
R19	ERJ3GEYJ222	2.2k	
R31	ERDS2TJ471	470	S
R33	ERJ3GEYJ563	56k	
R34	ERJ3GEYJ563	56k	
R35	ERJ3GEYJ114	110k	
R36	ERJ3GEYJ114	110k	
R37	ERDS2TJ222	2.2k	S
R39	ERJ3GEYJ123	12k	
R41	ERJ3GEY0R00	0	
R42	ERJ3GEYJ473	47k	
R45	ERJ3GEYJ331	330	
R46	ERJ3GEYJ152	1.5k	
R47	ERJ3GEYJ152	1.5k	
R48	ERJ3GEYJ153	15k	
R49	ERJ3GEYJ153	15k	
R50	ERJ3GEYJ394	390k	
R51	ERJ3GEYJ224	220k	
R52	ERJ3GEYJ222	2.2k	
R53	ERJ3GEY0R00	0	
R62	ERJ3GEYJ473	47k	
R63	ERJ3GEYJ331	330	
R64	ERJ3GEYJ223	22k	
R67	ERJ3GEY0R00	0	
R72	ERJ3GEYJ154	150k	
R73	ERJ3GEYJ114	110k	
R74	ERJ3GEYJ103	10k	
R75	ERJ3GEYJ153	15k	
R80	ERJ3GEYJ103	10k	
R81	ERJ3GEYJ622	6.2k	
R82	ERDS1TJ472	4.7k	S
R83	ERDS1TJ472	4.7k	S
R84	ERDS1TJ472	4.7k	S
R85	ERDS1TJ472	4.7k	S
		(CAPACITORS)	
C1	ECUV1H103KBV	0.01	
C2	ECUV1H103KBV	0.01	
C8	ECUV1H103KBV	0.01	
C11	ECQE2E105KZ	1	S
C20	ECUV1H103KBV	0.01	
C23	ECUV1C104KBV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C24	ECUV1C104KBV	0.1	
C25	ECUV1H181JCV	180P	
C26	ECUV1E104ZFV	0.1	
C30	ECEA1HKS4R7	4.7	S
C31	ECUV1C273KBV	0.027	
C33	ECUV1H182KBV	0.0018	
C43	ECUV1H102KBV	0.001	
C44	ECEA1HKS4R7	4.7	S
C46	ECUV1H103KBV	0.01	
C47	ECEA1CKS100	10	S
C50	ERJ3GEY0R00	0	
C51	ECUV1H103KBV	0.01	
C52	ECUV1H103KBV	0.01	
C53	ECUV1H333KBV	0.033	S
C54	ECUV1H333KBV	0.033	S
C55	ECUV1H271JCV	270P	
C57	ERJ3GEY0R00	0	
C58	ECEA1CKS470	47	S
C61	ECEA1CKS470	47	S

10.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFLP1399LAZ	OPERATION BOARD ASS`Y (RTL)	
		(IC)	
IC1	PQVIMC4051BF	IC	S
		(TRANSISTORS)	
Q1	PQVTDTA143EU	TRANSISTOR(SI)	S
Q2	PQVTDTA143EU	TRANSISTOR(SI)	S
Q3	PQVTDTA143EU	TRANSISTOR(SI)	S
		(DIODE)	
D1	1SS133	DIODE(SI)	S
		(CONNECTORS)	
CN1	PFJS09A13Z	CONNECTOR,9PIN	
CN2	PFJS06A13Z	CONNECTOR,6PIN	S
		(LIQUID CRYSTAL DISPLAY)	
CN3	PFAVM220	LIQUID CRYSTAL DISPLAY	
		(PHOTO ELECTRIC TRANSDUCERS)	
PS1	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
PS2	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
		(SWITCHES)	
SW6	EVQ11Y05B	SPECIAL SWITCH	
SW7	EVQ11Y05B	SPECIAL SWITCH	
SW8	EVQ11Y05B	SPECIAL SWITCH	
SW9	EVQ11Y05B	SPECIAL SWITCH	
SW10	EVQ11Y05B	SPECIAL SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
SW11	EVQ11Y05B	SPECIAL SWITCH	
SW12	EVQ11Y05B	SPECIAL SWITCH	
SW13	EVQ11Y05B	SPECIAL SWITCH	
SW14	EVQ11Y05B	SPECIAL SWITCH	
SW15	EVQ11Y05B	SPECIAL SWITCH	
SW16	EVQ11Y05B	SPECIAL SWITCH	
SW17	EVQ11Y05B	SPECIAL SWITCH	
SW18	EVQ11Y05B	SPECIAL SWITCH	
SW19	EVQ11Y05B	SPECIAL SWITCH	
SW20	EVQ11Y05B	SPECIAL SWITCH	
SW21	EVQ11Y05B	SPECIAL SWITCH	
SW22	EVQ11Y05B	SPECIAL SWITCH	
SW23	EVQ11Y05B	SPECIAL SWITCH	
SW24	EVQ11Y05B	SPECIAL SWITCH	
SW25	EVQ11Y05B	SPECIAL SWITCH	
SW26	EVQ11Y05B	SPECIAL SWITCH	
SW27	EVQ11Y05B	SPECIAL SWITCH	
SW28	EVQ11Y05B	SPECIAL SWITCH	
SW29	EVQ11Y05B	SPECIAL SWITCH	
SW30	EVQ11Y05B	SPECIAL SWITCH	
SW31	EVQ11Y05B	SPECIAL SWITCH	
		(RESISTORS)	
R2	ERJ3GEYJ103	10k	
R3	ERJ3GEYJ103	10k	
R4	ERJ3GEYJ103	10k	
R5	ERJ3GEYJ103	10k	
R7	ERJ3GEYJ103	10k	
R10	ERJ3GEYJ103	10k	
R11	ERJ3GEYJ271	270	
R12	ERJ3GEYJ563	56k	
R13	ERJ3GEYJ103	10k	
R14	ERJ3GEYJ471	470	
R15	ERJ3GEYJ103	10k	
R16	ERJ3GEYJ471	470	
R17	ERJ3GEYJ103	10k	
R18	ERJ3GEYJ471	470	
R19	ERJ3GEYJ103	10k	
R20	ERJ3GEYJ471	470	
R28	ERJ3GEYJ103	10k	
R30	ERJ3GEYJ751	750	
R33	ERJ3GEYJ4R7	4.7	
		(CAPACITORS)	
C1	ECUV1E104ZFV	0.1	
C2	ECEA0JKS101	100	
C6	ECUV1C224ZFV	0.22	S

10.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1227MZL	POWER SUPPLY BOARD ASS'Y(RTL)	
		(IC)	
IC202	PFVITA7805F	IC	S
		(TRANSISTORS)	
Q101	2SK2640	TRANSISTOR(SI)	⚠
Q102	2SC1741S	TRANSISTOR(SI)	
Q201	2SC1740S	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	S ⚠
D102	PFVD1N4005	DIODE(SI)	S ⚠
D103	PFVD1N4005	DIODE(SI)	S ⚠
D104	PFVD1N4005	DIODE(SI)	S ⚠
D105	MA4030	DIODE(SI)	
D106	MA165	DIODE(SI)	
D107	MA165	DIODE(SI)	
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVDD1NL20U	DIODE(SI)	S
D204	MA2300	DIODE(SI)	
D205	MA4075M	DIODE(SI)	
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2PIN	⚠
CN301	PQJP8G30Y	CONNECTOR, 8PIN	⚠
		(COILS)	
L101	PFLES11V0712	COIL	S ⚠
		(VARISTORS)	
ZNR101	ERZV10DK471U	VARISTOR	⚠
ZNR102	ERZV10DK471U	VARISTOR	⚠
		(PHOTO COUPLER)	
PC101	0N3131SKU	PHOTO ELECTRIC TRANSDUCER	⚠
		(FUSE)	
F101	PQBA1C50NBKL	FUSE	S ⚠
		(TRANSFORMER)	
T101	ETS29AK415AC	TRANSFORMER	⚠
		(VARIABLE RESISTOR)	
VR201	EVNDJAA03B53	VARIABLE RESISTOR	
		(RESISTORS)	
R101	ERG2SJ562	5.6k	
R102	ERDS2TJ224	220k	
R103	ERDS2TJ224	220k	

Ref. No.	Part No.	Part Name & Description	Remarks
R104	PQ4R10XJ153	15k	S
R105	PQ4R10XJ100	10	S
R106	ERG2SJ101	100	
R107	ERG2SJ101	100	
R108	ERDS2TJ104	100k	
R109	ERDS2TJ512	5.1k	
R110	ERDS2TJ220	22	
R111	PQ4R10XJ334	330k	S
R112	PQ4R10XJ334	330k	S
R113	PQ4R10XJ334	330k	S
R205	ERG2SJ681	680	
R206	ERG2SJ681	680	
R221	PQ4R10XJ681	680	S
R222	PQ4R10XJ472	4.7k	S
R223	PQ4R10XJ101	100	S
R224	PQ4R10XJ223	22k	S
R225	PQ4R10XJ123	12k	S
R226	PQ4R10XJ222	2.2k	S
		(CAPACITORS)	
C101	ECQU2A104MV	0.1	⚠
C102	ECQU2A104MV	0.1	⚠
C103	ECKNTS222ME	0.0022	⚠
C104	ECKNTS222ME	0.0022	⚠
C105	ECKNTS222ME	0.0022	
C106	PFEU200SX180	180	S
C107	ECKZ3A331KB	330P	S
C109	ECQB1H103JF	0.01	
C110	PQCUV1H682KB	0.0068	S
C201	EEUFA1V471	470	
C202	ECKD3A102KBP	0.001	
C203	PFCEA16A470	47P	S
C205	PFCEA50A1M	1	S
C207	PFCEA35A47M	47	S

10.6. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description
EC1	PQZZ8K18Z	CONNECTOR, 8 PIN
EC2	PFZZ17K2Z	CONNECTOR, 17 PIN
EC3	PFZZ5K13Z	CONNECTOR, 5 PIN
EC4	PFZZ11K13Z	CONNECTOR, 11 PIN
EC5	PQZZ2K1Z	CONNECTOR, 2 PIN
EC6	PFZZ6K1Z	CONNECTOR, 6 PIN
EC7	PFZZ11K14Z	CONNECTOR, 11 PIN
EC8	PFZZ10K4Z	CONNECTOR, 10 PIN
EC9	PQZZ2K1Z	CONNECTOR, 2 PIN
EC10	PFZZ2K2Z	CONNECTOR, 2 PIN
	KM79811245C0	BASIC FACSIMILE TECHNIQUE

Notes:
Tools and Extension Cords are useful for servicing. / (They make servicing easy.)

11. PRINTED CIRCUIT BOARD

11.1. DIGITAL BOARD : COMPONENT VIEW

11.2. DIGITAL BOARD (PCB1) : BOTTOM VIEW

11.3. ANALOG BOARD (PCB2) : COMPONENT VIEW

11.4. ANALOG BOARD (PCB2) : BOTTOM VIEW

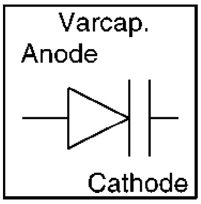
11.5. OPERATION BOARD (PCB3)

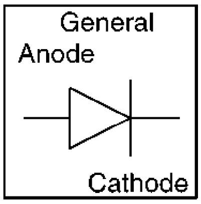
11.6. POWER SUPPLY BOARD (PCB4)

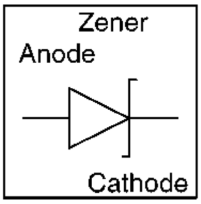
12. FOR THE SCHEMATIC DIAGRAMS

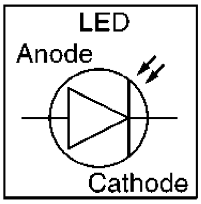
Note:

1. **DC voltage measurements are taken with an oscilloscope or a tester with a ground.**
2. **The schematic diagrams and circuit board may be modified at any time with the development of new technology.**


Varcap.
Anode
Cathode


General
Anode
Cathode


Zener
Anode
Cathode


LED
Anode
Cathode

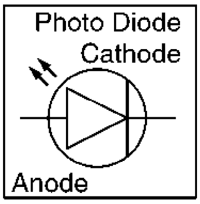


Photo Diode
Cathode
Anode

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

13. SCHEMATIC DIAGRAM

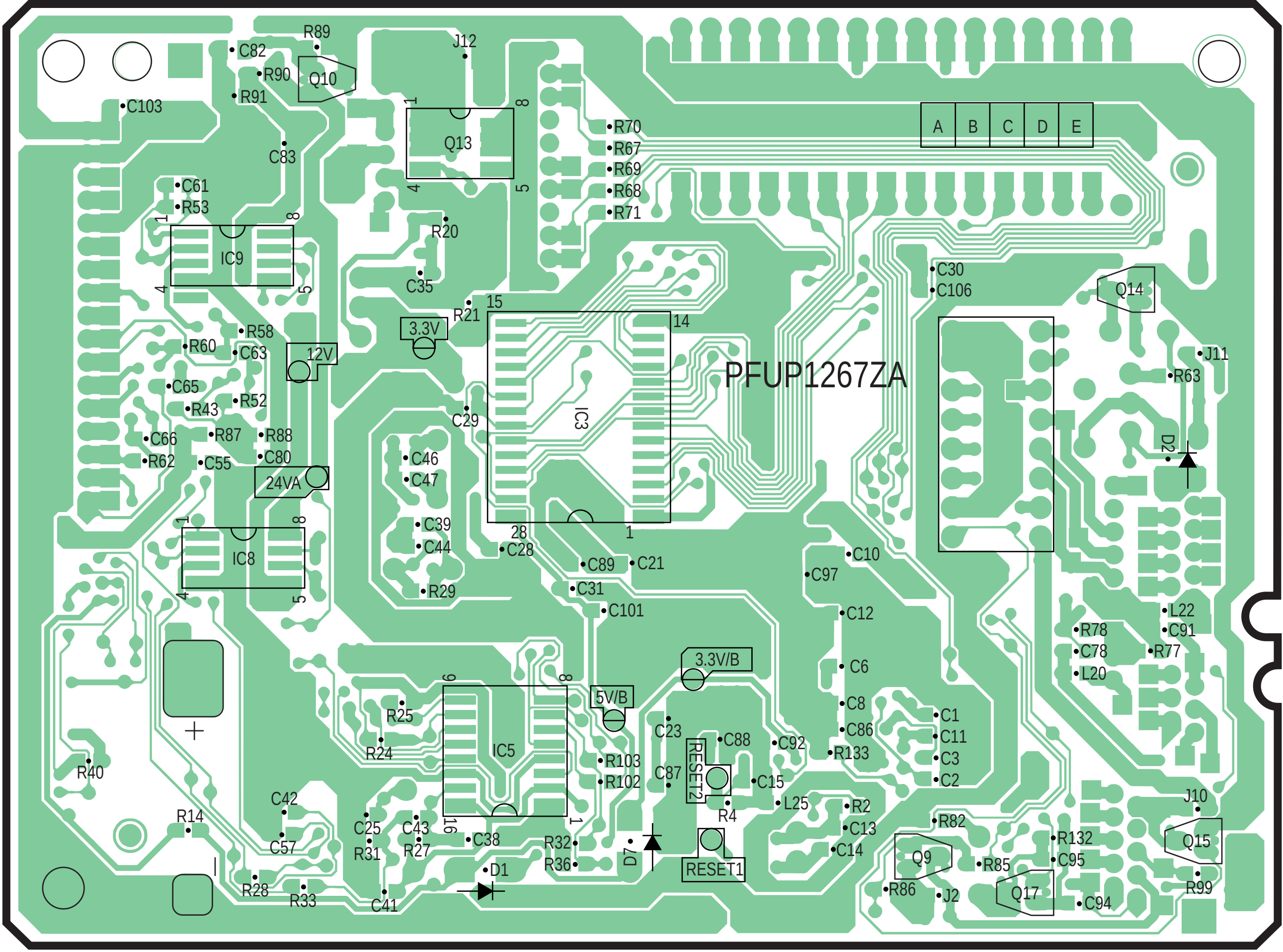
13.1. DIGITAL BOARD (PC1)

13.2. ANALOG CIRCUIT (PCB2)

13.3. OPERATION BOARD (PCB3)

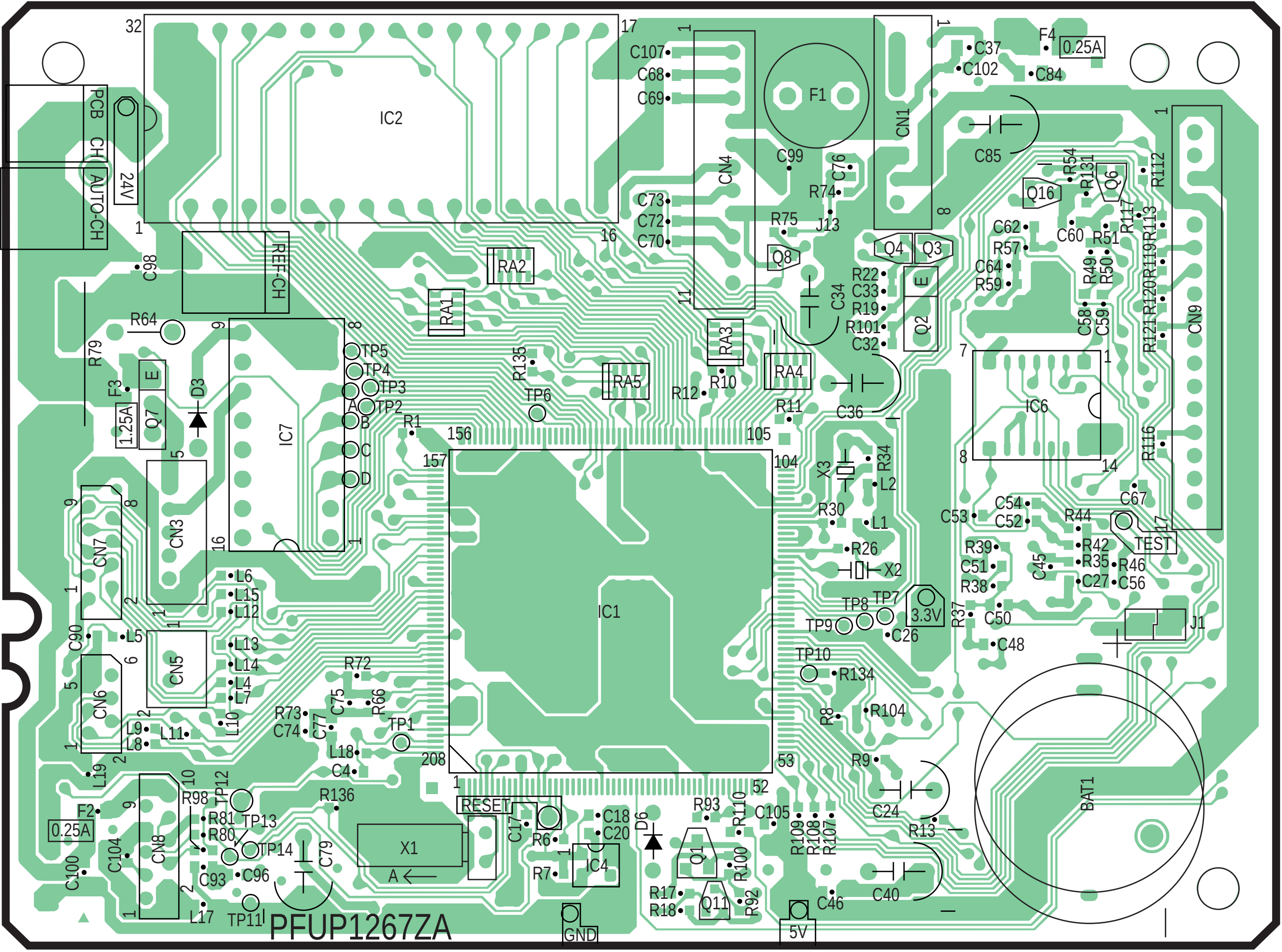
13.4. POWER SUPPLY BOARD (PCB4)

Y.M / KXFT71LAB /

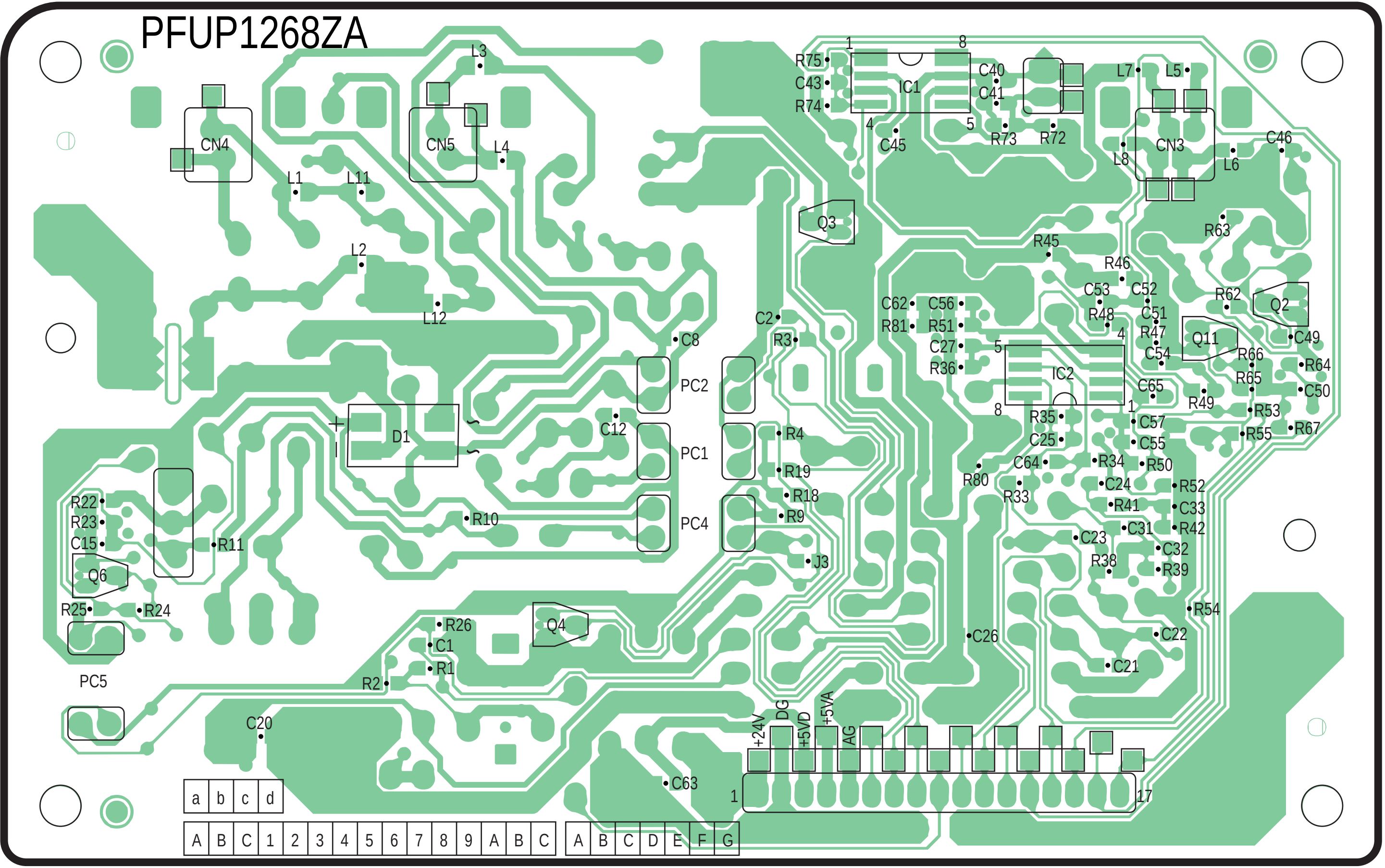

R89
C82
J12
R90
Q10
R91
C103
1
8
Q13
4
5
C83
R70
R67
R69
R68
R71
A
B
C
D
E
C61
R53
1
8
IC9
4
5
R20
C35
C30
C106
Q14
15
R21
14
3.3V
R58
R60
C63
12V
J11
R63
PFUP1267ZA
C65
R52
R43
C29
IC3
R87
R88
C66
C46
D2
R62
C55
C80
C47
24VA
1
8
C39
28
IC8
1
C44
C28
C89
C21
C10
4
5
R29
C97
C31
C101
C12
L22
R78
C91
C78
R77
L20
3.3V/B
C6
9
8
R25
5V/B
C8
C1
C23
C88
C86
C11
R24
IC5
C92
R133
R40
R103
RESET2
C3
R102
C87
C15
C2
C42
L25
R2
J10
R14
16
1
R4
R82
C13
C25
C43
C38
R32
R132
Q15
C57
C14
Q9
R31
R27
D7
C95
R85
R36
D1
RESET1
R28
R86
J2
Q17
R99
R33
C41
C94
+
|

DIGITAL BOARD (COMPONENT)

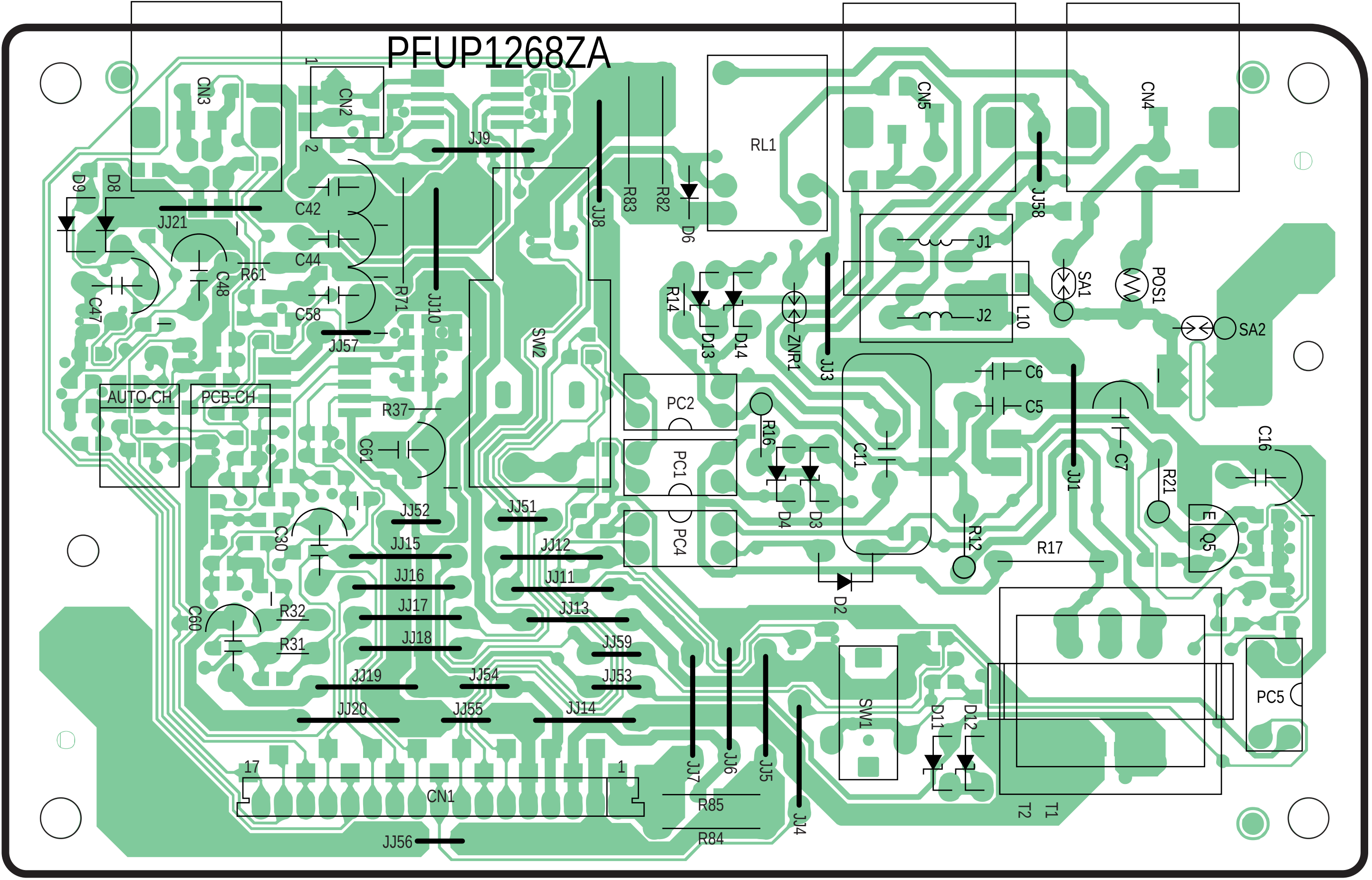
KX-FT71LA-B


32
17
16
1
IC2
C107
C68
C69
CN4
F1
CN1
C37
C102
F4
0.25A
C84
C85
PCB
CH
AUTO-CH
24V
REF-CH
C99
C76
R74
R75
J13
C73
C72
C70
11
8
R54
R131
Q16
Q6
R112
CN9
C62
C60
R51
R117
R113
R57
C64
R59
R49
R50
R119
R120
R121
C58
C59
Q4
Q3
Q8
E
Q2
C34
R22
C33
R19
R101
C32
RA2
RA1
RA3
RA4
RA5
C98
R64
R79
F3
1.25A
Q7
D3
IC7
TP5
TP4
TP3
TP2
A
B
C
D
R1
R135
TP6
R12
R10
R11
C36
IC6
7
14
R116
156
157
105
104
X3
R34
L2
R30
L1
C53
C54
C52
C67
R44
TEST
R26
X2
R39
R42
C51
C45
R35
R46
R38
C27
C56
TP8
TP7
3.3V
R37
C50
TP9
C26
C48
J1
TP10
R134
R104
R8
R9
CN3
CN7
CN5
CN6
L6
L15
L12
L5
L13
L14
L4
L7
L10
L11
L9
L8
C90
IC1
R72
C75
R66
R73
C74
C77
TP1
L18
C4
208
53
52
L19
F2
0.25A
C104
C100
CN8
R98
TP12
R81
TP13
R80
TP14
C93
C96
C79
R136
X1
A
RESET
C17
C18
C20
R6
R7
IC4
D6
R93
R110
C105
R109
R108
R107
Q1
R100
R17
R18
Q11
R92
C46
C24
R13
C40
BAT1
TP11
L17
PFUP1267ZA
GND
5V

DIGITAL BOARD (BOTTOM)
KX-FT71LA-B

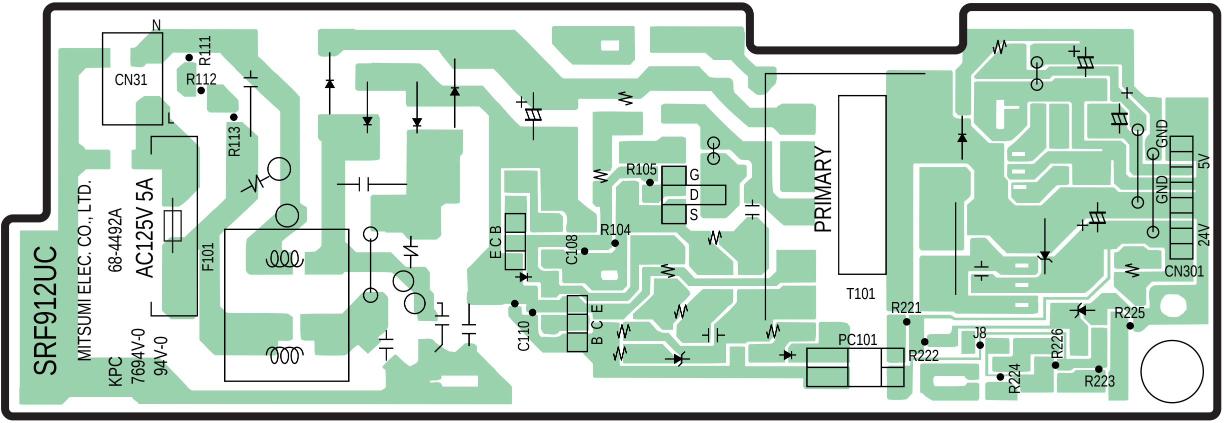

PFUP1268ZA
L3
1
8
R75
C43
R74
IC1
4
5
C40
C41
C45
R73
R72
L7
L5
CN4
CN5
L4
CN3
L8
L6
C46
L1
L11
Q3
R63
L2
R45
R46
C53
C52
R62
Q2
L12
C62
C56
R81
R51
C2
C8
R3
C27
R36
R48
C51
R47
4
5
Q11
C49
C54
R66
R64
IC2
R65
C50
PC2
C65
R49
8
1
R53
D1
C12
R35
C57
R4
C25
C55
R67
R55
PC1
R19
C64
R34
R50
R80
R18
R33
C24
R52
R22
R23
C15
R10
R9
R41
C33
R11
PC4
C31
R42
C23
C32
R38
R39
Q6
J3
R25
R24
R26
Q4
R54
C1
C26
C22
R1
R2
C21
PC5
C20
+24V
DG
+5VD
+5VA
AG
C63
1
17
a
b
c
d
A
B
C
1
2
3
4
5
6
7
8
9
A
B
C
A
B
C
D
E
F
G

ANALOG BOARD (COMPONENT)
KX-FT71LA-B

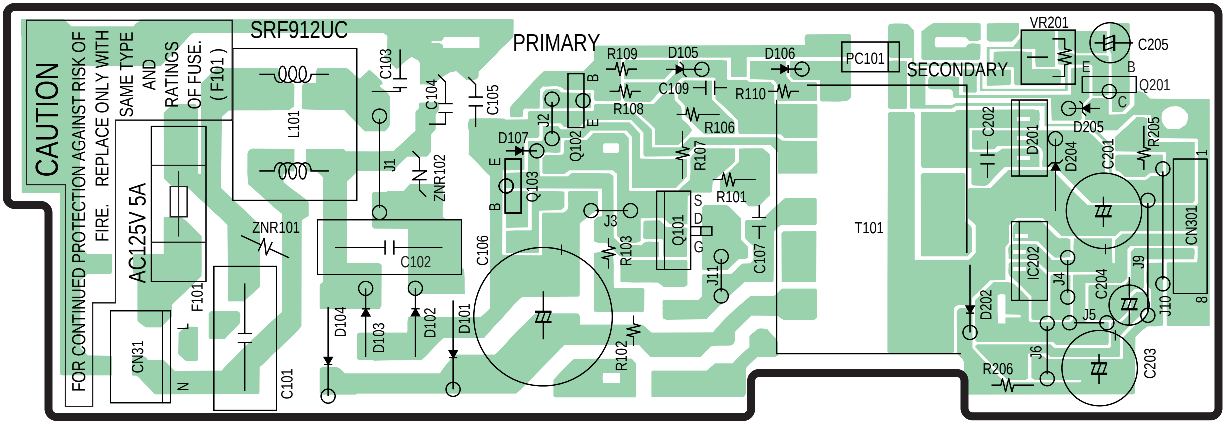

PFUP1268ZA
CN3
CN2
1
2
JJ9
JJ8
R83
R82
D6
RL1
CN5
CN4
JJ58
D9
D8
JJ21
C42
C44
C58
JJ57
R61
C48
C47
R71
JJ10
SW2
J1
J2
L10
SA1
POS1
SA2
R14
D13
D14
ZNR1
JJ3
AUTO-CH
PCB-CH
R37
C61
PC2
PC1
PC4
R16
D4
D3
C11
C6
C5
C7
JJ1
C16
R21
E
Q5
R12
R17
D2
JJ52
JJ51
JJ15
JJ12
JJ16
JJ11
JJ17
JJ13
JJ18
JJ59
C30
C60
R32
R31
JJ19
JJ54
JJ53
JJ20
JJ55
JJ14
JJ7
JJ6
JJ5
JJ4
SW1
D11
D12
T2
T1
PC5
17
1
CN1
R85
R84
JJ56

ANALOG BOARD (BOTTOM)
KX-FT71LA-B

(COMPONENT VIEW)

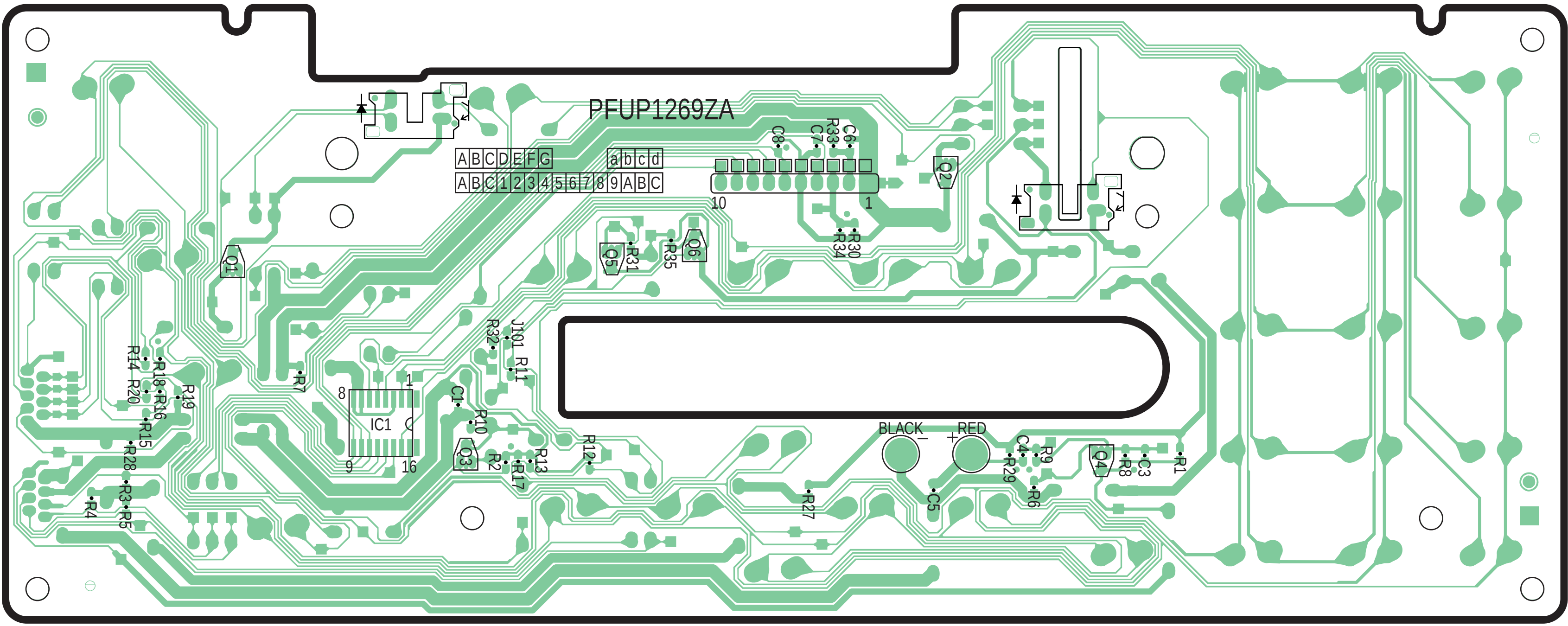

N
CN31
L
R111
R112
R113
SRF912UC
MITSUMI ELEC. CO., LTD.
68-4492A
AC125V 5A
F101
KPC
7694V-0
94V-0
E C B
C108
R104
R105
G
D
S
PRIMARY
T101
C110
B C E
PC101
R221
R222
J8
R224
R226
R223
R225
GND
GND
5V
24V
CN301

(BOTTOM VIEW)

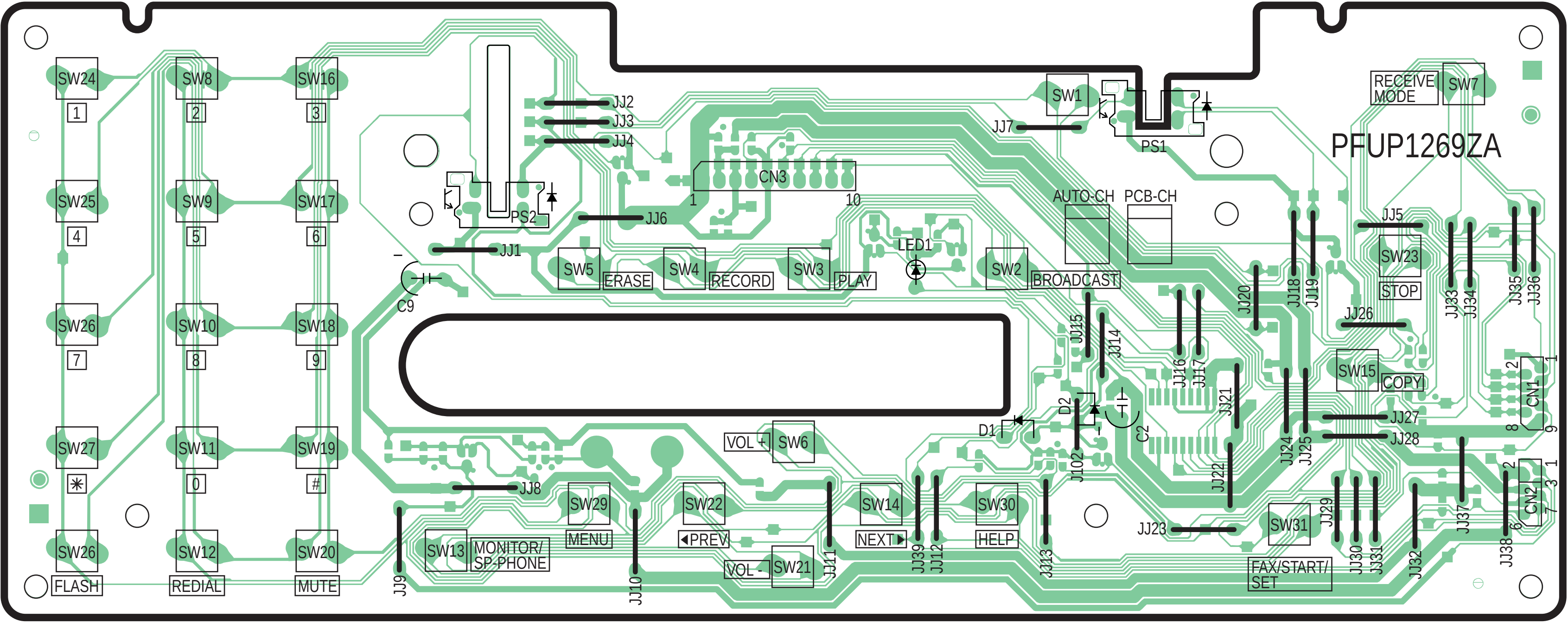

CAUTION
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE AND RATINGS OF FUSE. (F101)
SRF912UC
PRIMARY
R109
D105
D106
PC101
SECONDARY
VR201
C205
E
B
Q201
C
C103
C104
C105
L101
J1
ZNR102
J2
Q102
B
E
R108
C109
R110
R106
D107
E
Q103
B
R107
R101
C106
J3
S
D
G
Q101
R103
J11
C107
T101
ZNR101
C102
AC125V 5A
F101
L
CN31
N
C101
D104
D103
D102
D101
R102
C202
D201
D205
D204
R205
C201
1
CN301
8
IC202
J4
C204
J9
J10
D202
J5
J6
R206
C203

POWER SUPPLY BOARD
KX-FT71LA-B

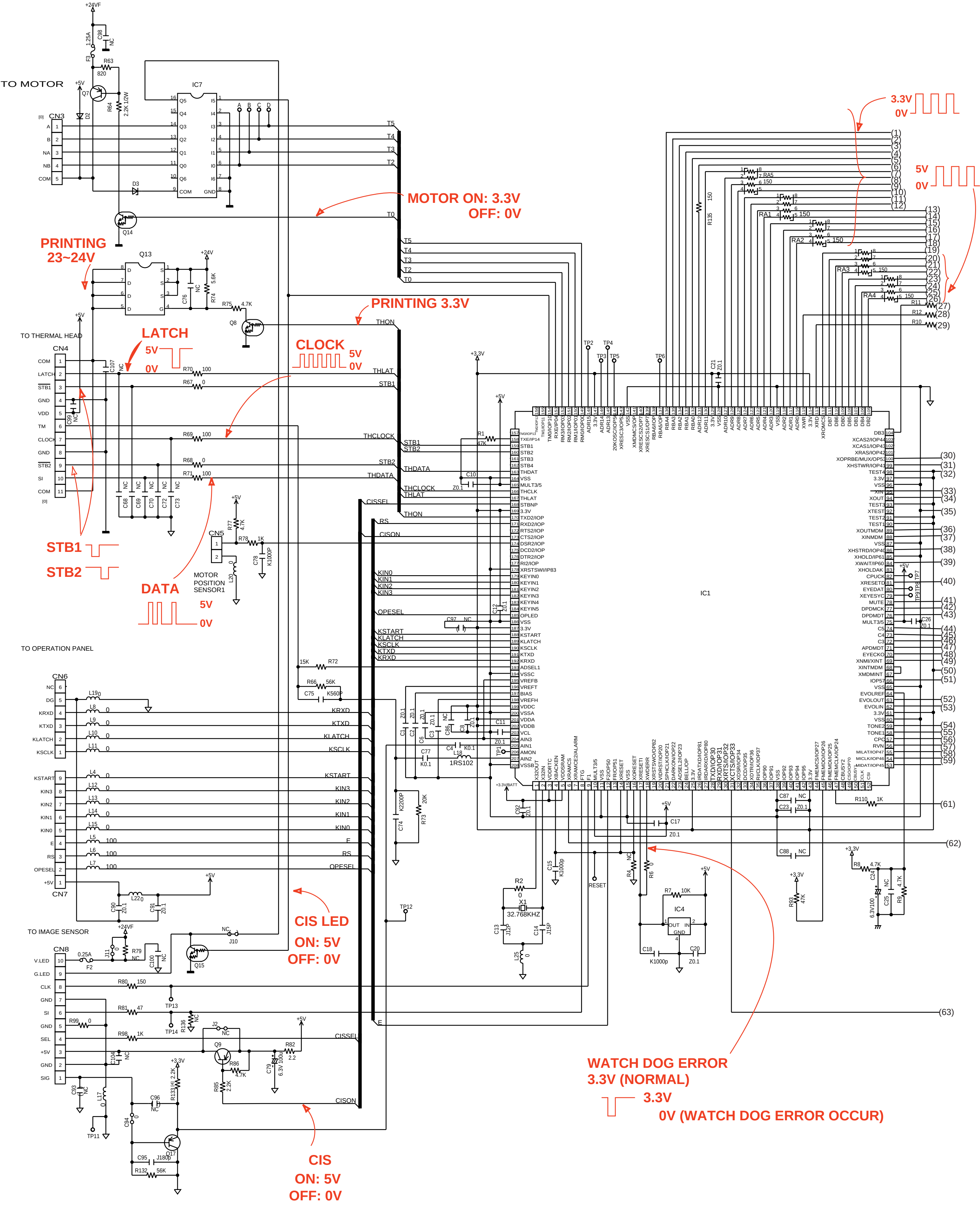
(COMPONENT VIEW)


PFUP1269ZA
A B C D E F G
a b c d
A B C 1 2 3 4 5 6 7 8 9 A B C
C8
C7
R33
C6
10
1
Q2
R30
R34
Q6
R35
R31
Q5
Q1
R32
J101
R11
R7
R14
R18
R16
R20
R19
R15
R28
R3
R5
R4
8
1
IC1
9
16
C1
R10
Q3
R2
R17
R13
R12
R27
BLACK
−
RED
+
C5
C4
R29
R9
R6
Q4
R8
C3
R1

(BOTTOM VIEW)


PFUP1269ZA
SW24
1
SW8
2
SW16
3
SW25
4
SW9
5
SW17
6
SW26
7
SW10
8
SW18
9
SW27
✳
SW11
0
SW19
#
SW26
FLASH
SW12
REDIAL
SW20
MUTE
JJ2
JJ3
JJ4
PS2
JJ1
JJ6
C9
CN3
1
10
SW5
ERASE
SW4
RECORD
SW3
PLAY
LED1
SW2
BROADCAST
SW1
JJ7
PS1
AUTO-CH
PCB-CH
RECEIVE MODE
SW7
JJ5
SW23
STOP
JJ18
JJ19
JJ20
JJ26
JJ33
JJ34
JJ35
JJ36
JJ15
JJ14
JJ16
JJ17
JJ21
SW15
COPY
CN1
1
2
8
9
JJ27
JJ28
D2
D1
C2
JJ102
JJ22
JJ24
JJ25
VOL +
SW6
JJ8
SW29
MENU
SW22
◀PREV
SW14
NEXT▶
SW30
HELP
SW13
MONITOR/ SP-PHONE
VOL -
SW21
JJ9
JJ10
JJ11
JJ39
JJ12
JJ13
JJ23
SW31
FAX/START/ SET
JJ29
JJ30
JJ31
JJ32
JJ37
JJ38
CN2
1
2
3
6
7

OPERATION BOARD
KX-FT71LA-B



TO MOTOR
CN3
IC7
Q7
Q14
Q13
Q8
TO THERMAL HEAD
CN4
COM
LATCH
STB1
GND
VDD
TM
CLOCK
GND
STB2
SI
COM
CN5
MOTOR POSITION SENSOR1
TO OPERATION PANEL
CN6
CN7
TO IMAGE SENSOR
CN8
V.LED
G.LED
CLK
GND
SI
GND
SEL
+5V
GND
SIG
Q9
Q15
Q17
IC1
IC4
X1 32.768KHZ
RESET
THON
THLAT
STB1
STB2
THCLOCK
THDATA
CISSEL
RS
CISON
KIN0
KIN1
KIN2
KIN3
OPESEL
KSTART
KLATCH
KSCLK
KTXD
KRXD
E
T0
T2
T3
T4
T5
RA1
RA2
RA3
RA4
R135
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP11
TP12
TP13
TP14
+24VF
+5V
+3.3V

3.3V
0V

5V
0V

MOTOR ON: 3.3V
OFF: 0V

PRINTING
23~24V

PRINTING 3.3V

LATCH
5V
0V

CLOCK
5V
0V

STB1

STB2

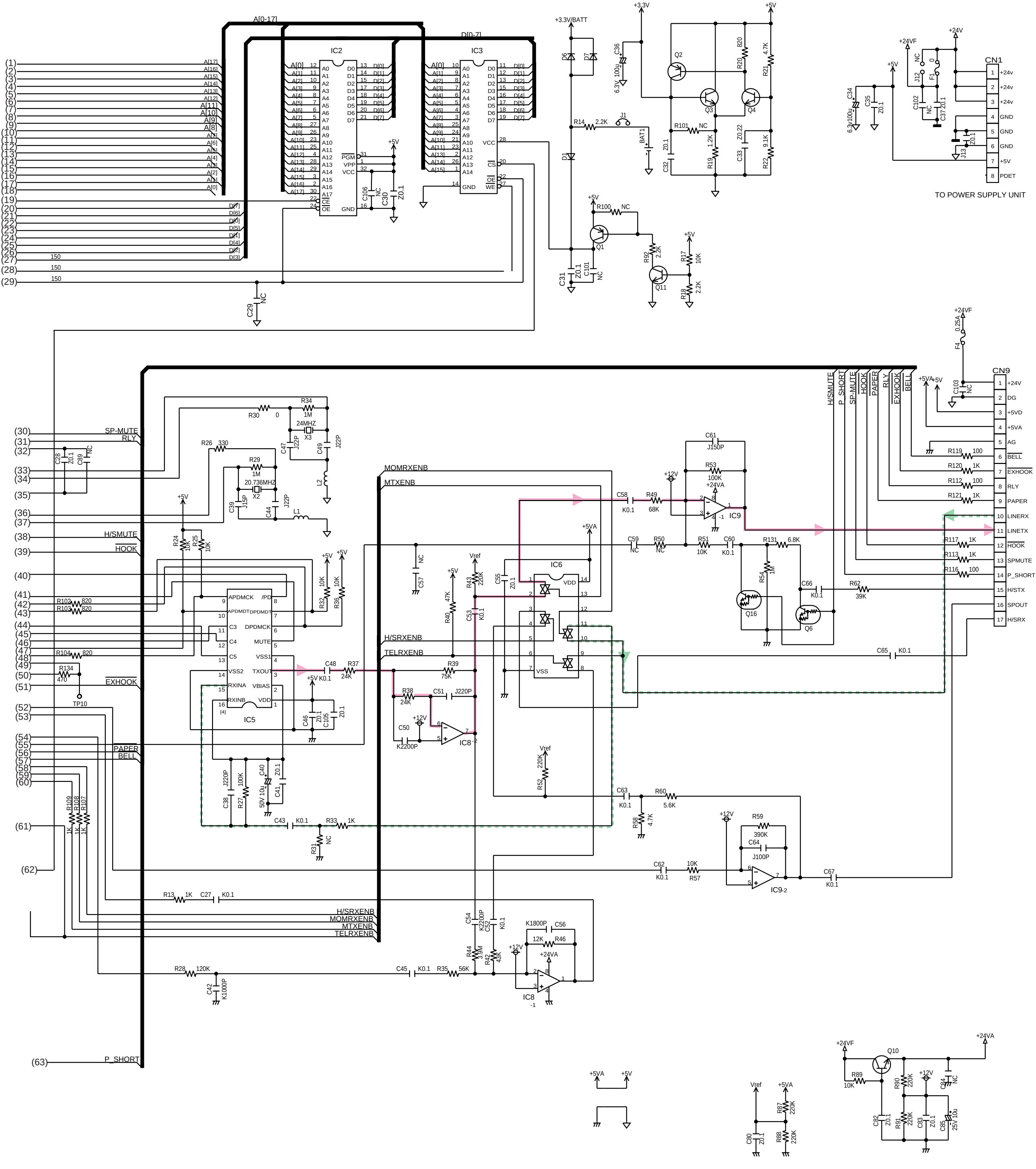
DATA
5V
0V

CIS LED
ON: 5V
OFF: 0V

CIS
ON: 5V
OFF: 0V

WATCH DOG ERROR
3.3V (NORMAL)
3.3V
0V (WATCH DOG ERROR OCCUR)

DIGITAL BOARD SCHEMATIC DIAGRAM
KX-F71LA-B


A[0-17]
D[0-7]
IC2
IC3
IC5
IC6
IC8
IC9
IC8-2
IC9-2
+3.3V/BATT
+3.3V
+5V
+24V
+24VF
+24VA
+5VA
+12V
Vref
CN1
+24v
GND
PDET
TO POWER SUPPLY UNIT
CN9
DG
+5VD
+5VA
AG
BELL
EXHOOK
RLY
PAPER
LINERX
LINETX
HOOK
SPMUTE
P_SHORT
H/STX
SPOUT
H/SRX
H/SMUTE
P_SHORT
SP-MUTE
HOOK
PAPER
RLY
EXHOOK
BELL
MOMRXENB
MTXENB
H/SRXENB
TELRXENB
SP-MUTE
RLY
H/SMUTE
HOOK
EXHOOK
PAPER
BELL
P_SHORT
APDMCK
/PD
APDMDT
DPDMDT
C3
DPDMCK
C4
MUTE
C5
VSS1
VSS2
TXOUT
RXINA
VBIAS
RXINB
VDD
VCC
PGM
VPP
GND
CE
OE
WE
CS
VSS
24MHZ
20.736MHZ
X2
X3
TP10
Q1
Q2
Q3
Q4
Q6
Q10
Q11
Q16
BAT1
J1
F1
F4
0.25A
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
(21)
(22)
(23)
(24)
(25)
(26)
(27)
(28)
(29)
(30)
(31)
(32)
(33)
(34)
(35)
(36)
(37)
(38)
(39)
(40)
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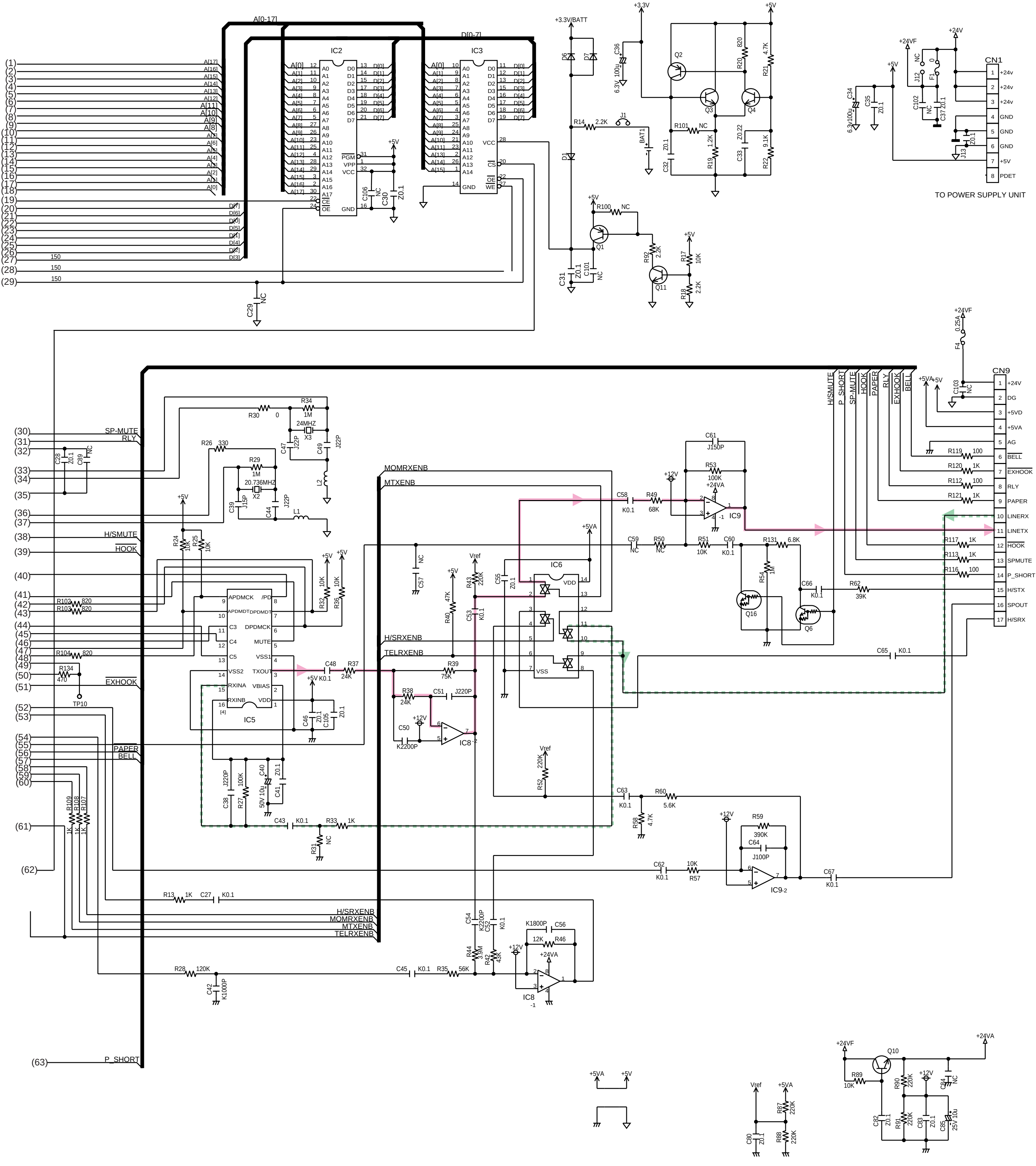
(44)
(45)
(46)
(47)
(48)
(49)
(50)
(51)
(52)
(53)
(54)
(55)
(56)
(57)
(58)
(59)
(60)
(61)
(62)
(63)

FAX TX signal

FAX RX signal

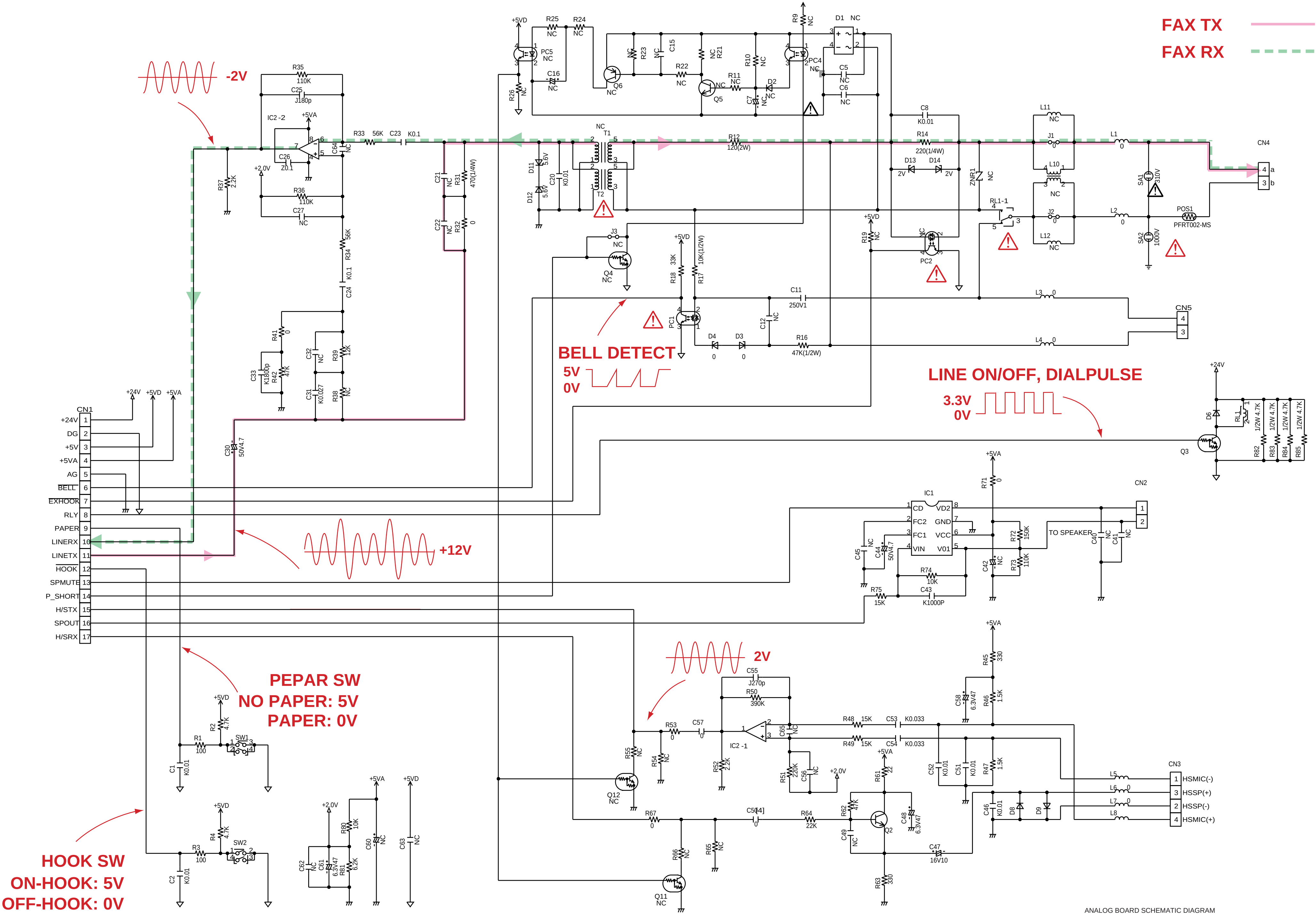
DIGITAL BOARD SCHEMATIC DIAGRAM
KX-F71LA-B


A[0-17]
D[0-7]
IC2
IC3
A[17]
A[16]
A[15]
A[14]
A[13]
A[12]
A[11]
A[10]
A[9]
A[8]
A[7]
A[6]
A[5]
A[4]
A[3]
A[2]
A[1]
A[0]
D[7]
D[6]
D[0]
D[5]
D[1]
D[4]
D[2]
D[3]
150
PGM
VPP
VCC
GND
CE
OE
CS
WE
+3.3V/BATT
+3.3V
+5V
+24V
+24VF
D6
D7
D1
C36
6.3V 100u
R14
2.2K
J1
BAT1
Q1
Q2
Q3
Q4
Q11
R20
820
R21
4.7K
R101
NC
R19
1.2K
R22
9.1K
C32
Z0.1
C33
Z0.22
R100
R92
2.2K
R17
10K
R18
C31
C101
C29
NC
C106
C30
CN1
+24v
GND
+5V
PDET
J12
F1
C34
C35
C102
C37
J13
TO POWER SUPPLY UNIT
SP-MUTE
RLY
C28
C89
H/SMUTE
HOOK
EXHOOK
PAPER
BELL
P_SHORT
R30
0
R34
1M
24MHZ
X3
C47
J22P
C49
L2
R26
330
R29
20.736MHZ
X2
C39
J15P
C44
L1
R24
R25
10K
R102
R103
R104
820
R134
470
TP10
R32
R36
IC5
APDMCK
/PD
APDMDT
DPDMDT
C3
DPDMCK
C4
MUTE
C5
VSS1
VSS2
TXOUT
RXINA
VBIAS
RXINB
VDD
C46
C105
C38
J220P
R27
100K
C40
50V 10u
C41
C43
K0.1
R33
1K
R31
MOMRXENB
MTXENB
H/SRXENB
TELRXENB
C57
R40
47K
C53
R43
220K
Vref
C55
IC6
VDD
VSS
C48
R37
24K
R39
75K
R38
C51
J220P
C50
K2200P
+12V
IC8-2
R52
C63
R60
5.6K
R58
4.7K
C58
R49
68K
C61
J150P
R53
100K
+24VA
IC9
C59
R50
R51
C60
R131
6.8K
R54
1M
Q16
Q6
C66
R62
39K
C65
+5VA
CN9
+24V
DG
+5VD
+5VA
AG
LINERX
LINETX
SPMUTE
H/STX
SPOUT
H/SRX
R119
R120
R112
R121
R117
R113
R116
100
C103
F4
0.25A
R59
390K
C64
J100P
C62
R57
IC9-2
C67
R109
R108
R107
R13
C27
C54
C52
K1800P
C56
R46
12K
R44
3.9M
R42
43K
C45
R35
56K
R28
120K
C42
K1000P
IC8-1
Q10
R89
R90
R91
C84
C82
C83
C85
25V 10u
R87
R88
C80

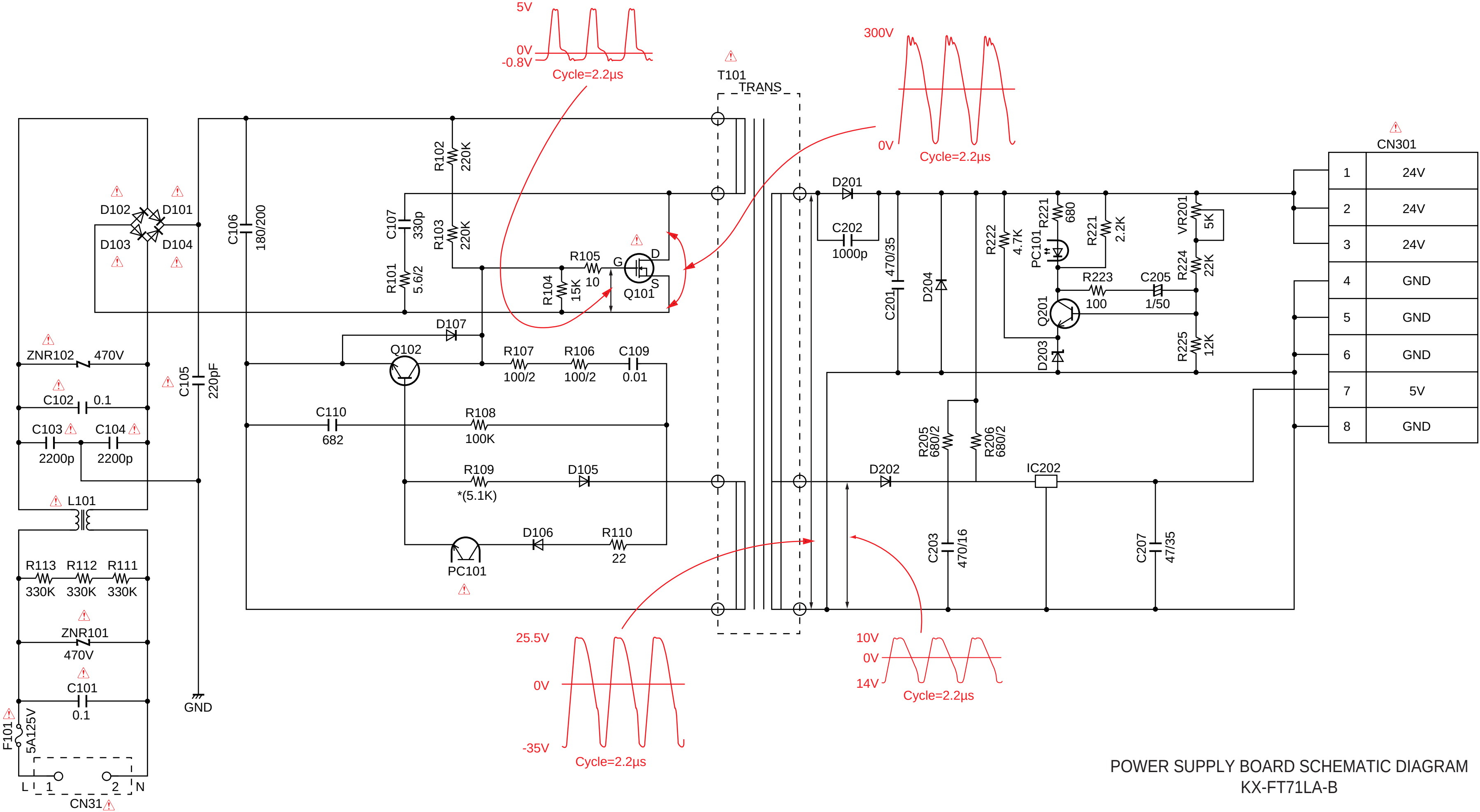
FAX TX signal

FAX RX signal

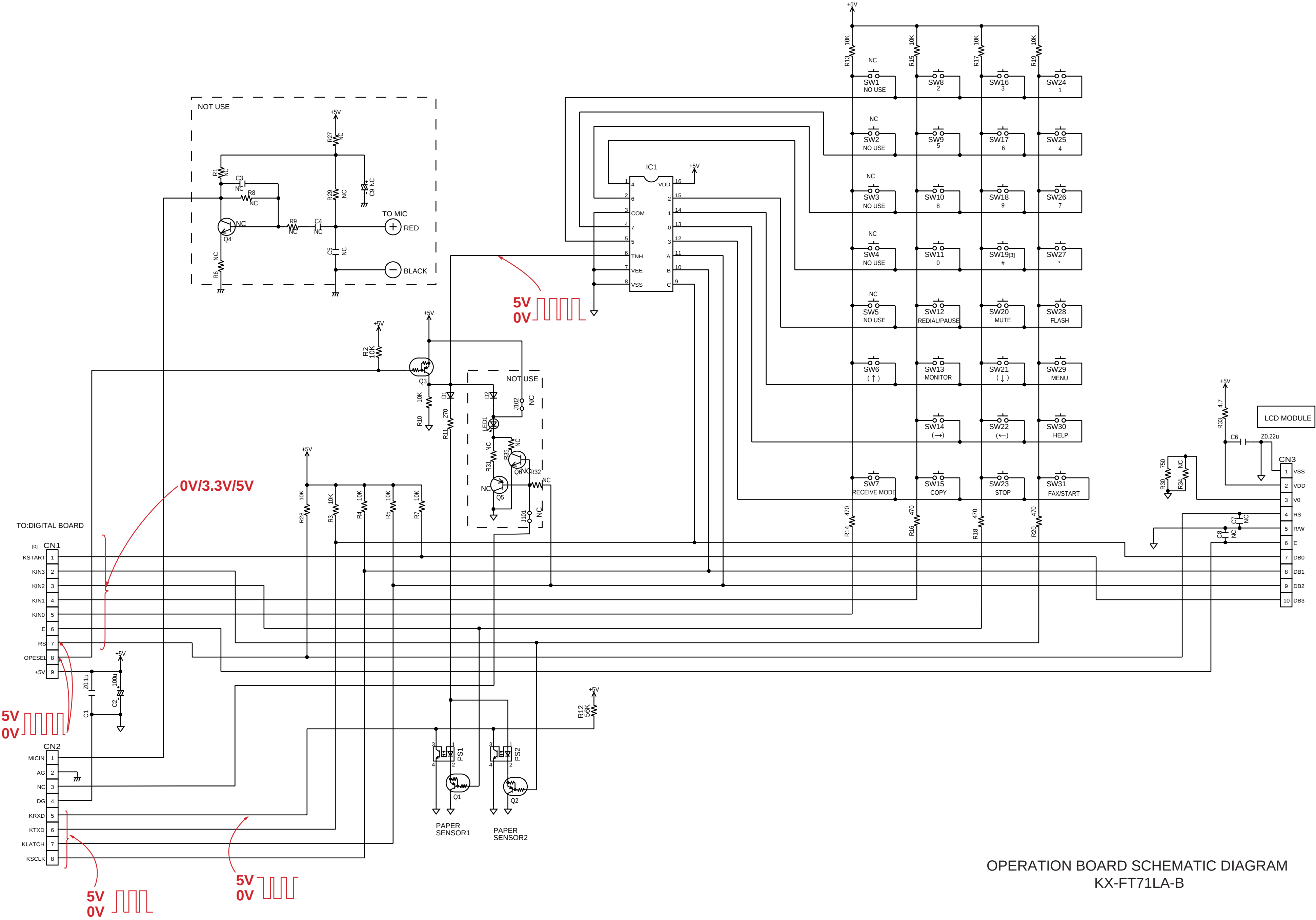
DIGITAL BOARD SCHEMATIC DIAGRAM
KX-F71LA-B


FAX TX
FAX RX
-2V
BELL DETECT
5V
0V
LINE ON/OFF, DIALPULSE
3.3V
0V
+12V
2V
PEPAR SW
NO PAPER: 5V
PAPER: 0V
HOOK SW
ON-HOOK: 5V
OFF-HOOK: 0V
CN1
+24V 1
DG 2
+5V 3
+5VA 4
AG 5
BELL 6
EXHOOK 7
RLY 8
PAPER 9
LINERX 10
LINETX 11
HOOK 12
SPMUTE 13
P_SHORT 14
H/STX 15
SPOUT 16
H/SRX 17
IC2 -2
IC2 -1
IC1
CD
FC2
FC1
VIN
VD2
GND
VCC
V01
TO SPEAKER
CN2
CN3
1 HSMIC(-)
3 HSSP(+)
2 HSSP(-)
4 HSMIC(+)
CN4
4 a
3 b
CN5
T1
T2
D1
RL1-1
RL1
POS1
PFRT002-MS
SA1
310V
SA2
1000V
ZNR1
PC1
PC2
PC4
PC5
Q2
Q3
Q4
Q5
Q6
Q11
Q12
SW1
SW2
R12
120(2W)
R14
220(1/4W)
R16
47K(1/2W)
R17
10K(1/2W)
R18
33K
C11
250V1
R35
110K
R36
110K
C25
J180p
C26
Z0.1
C23
K0.1
R33
56K
R31
470(1/4W)
C30
50V4.7
C8
K0.01
C55
J270p
R50
390K
C53
K0.033
C54
K0.033
R48
15K
R49
15K
R72
150K
R73
110K
R74
10K
R75
15K
C43
K1000P
C44
50V4.7
C48
6.3V47
C47
16V10
R82
R83
R84
R85
1/2W 4.7K
+24V
+5VD
+5VA
+2.0V
NC

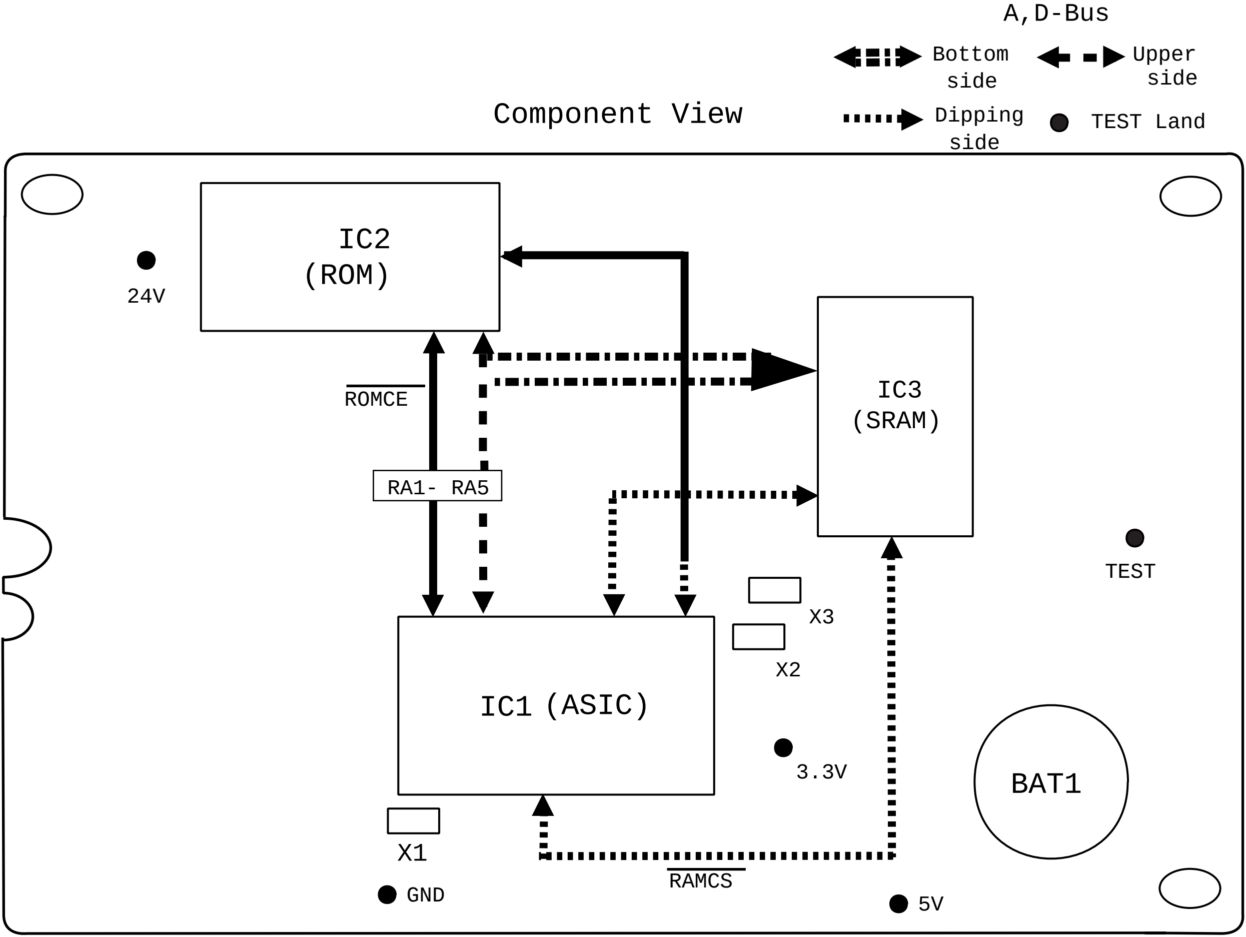
ANALOG BOARD SCHEMATIC DIAGRAM
KX-FT71LA-B

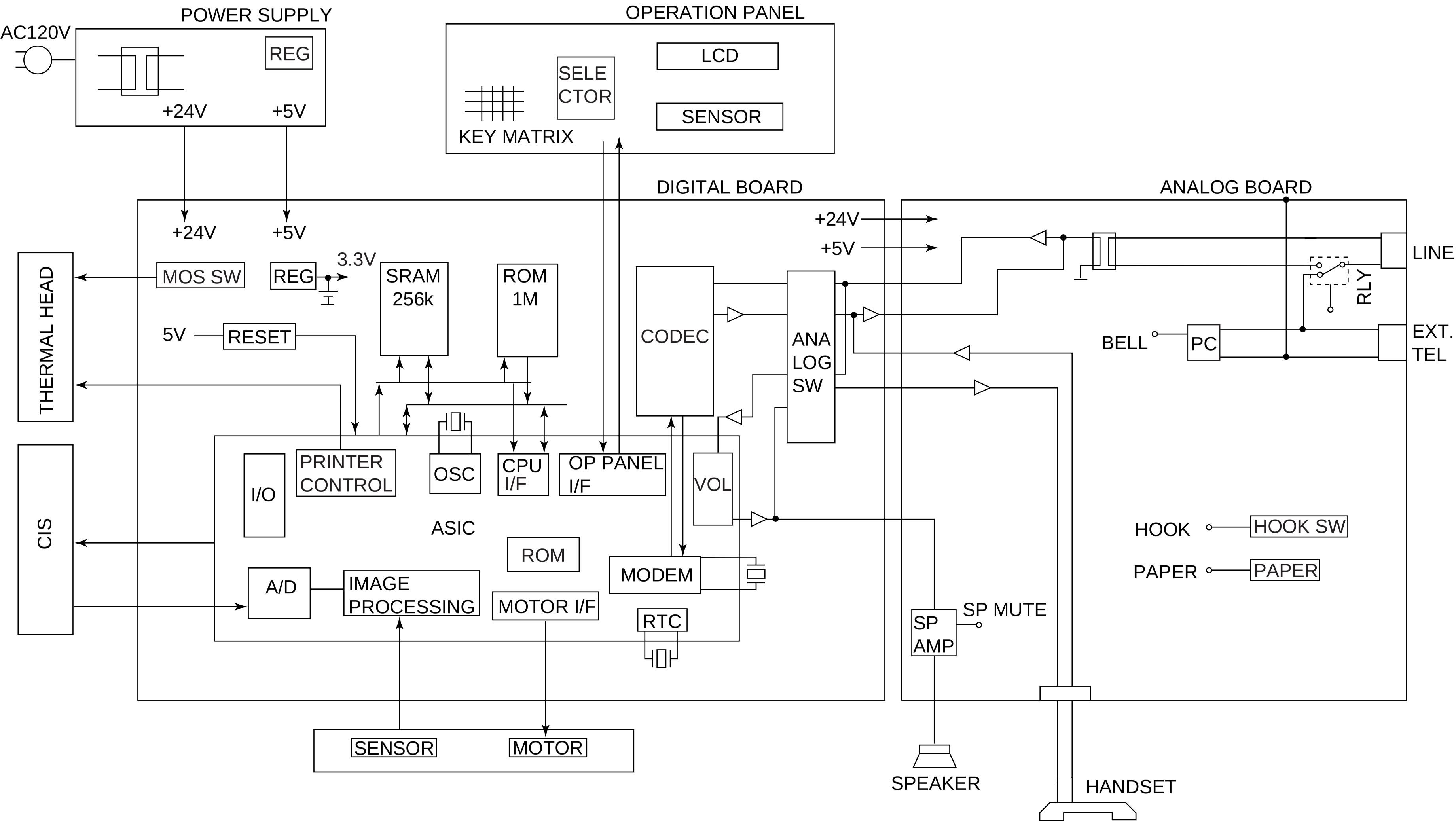

5V
0V
-0.8V
Cycle=2.2µs
300V
0V
Cycle=2.2µs
T101
TRANS
D102
D101
D103
D104
C106
180/200
R102
220K
C107
330p
R103
220K
R101
5.6/2
R105
10
R104
15K
G
D
S
Q101
D107
Q102
R107
100/2
R106
100/2
C109
0.01
ZNR102
470V
C102
0.1
C105
220pF
C103
C104
2200p
2200p
C110
682
R108
100K
R109
*(5.1K)
D105
L101
D106
R110
22
PC101
R113
330K
R112
330K
R111
330K
ZNR101
470V
C101
0.1
F101
5A125V
GND
L
1
2
N
CN31
D201
C202
1000p
C201
470/35
D204
R222
4.7K
R221
680
PC101
R221
2.2K
VR201
5K
R224
22K
R223
100
C205
1/50
Q201
D203
R225
12K
CN301
1
24V
2
24V
3
24V
4
GND
5
GND
6
GND
7
5V
8
GND
R205
680/2
R206
680/2
D202
IC202
C203
470/16
C207
47/35
25.5V
0V
-35V
Cycle=2.2µs
10V
0V
14V
Cycle=2.2µs

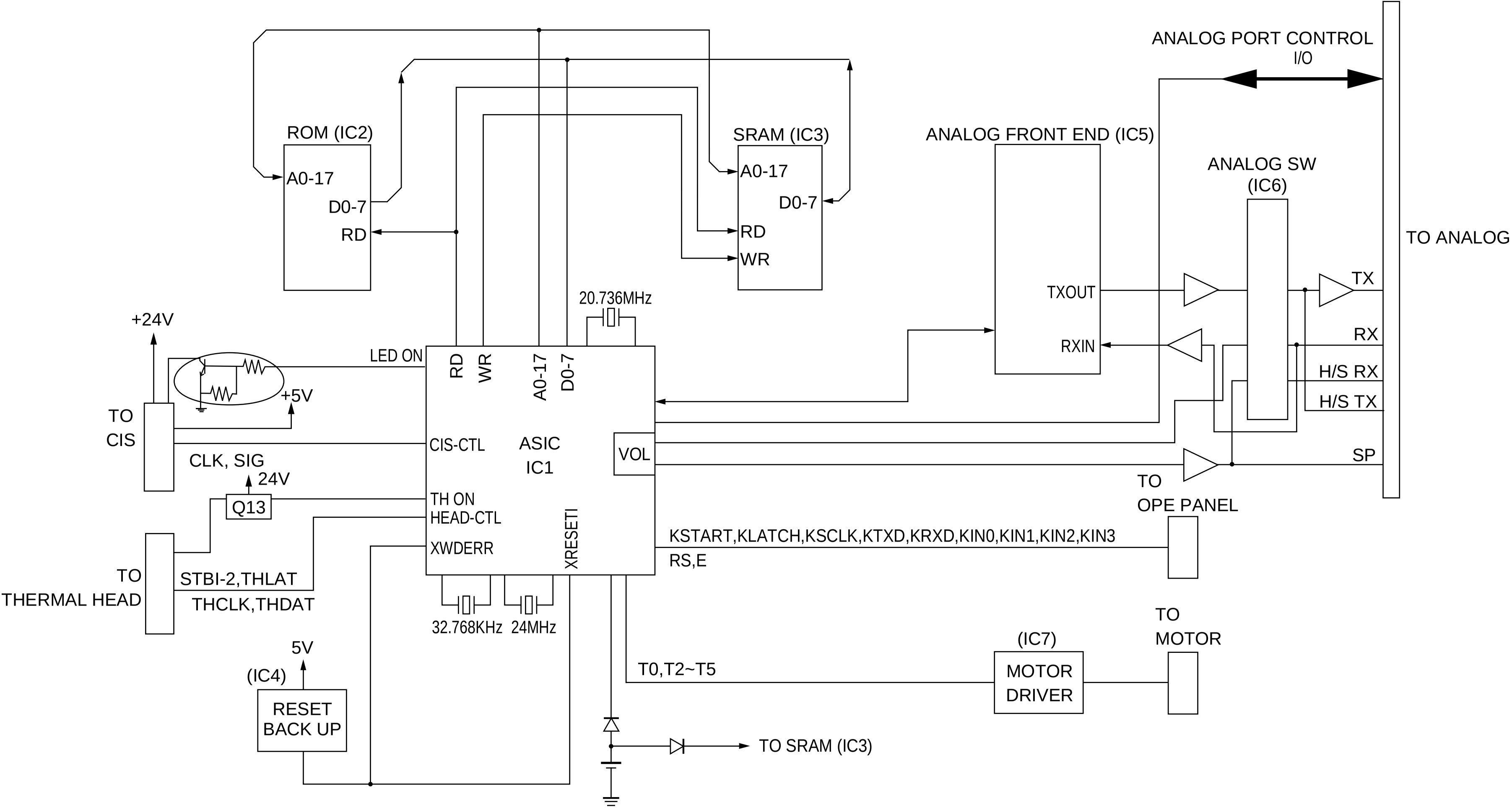
POWER SUPPLY BOARD SCHEMATIC DIAGRAM
KX-FT71LA-B


NOT USE
+5V
R27 NC
R1 NC
C3 NC
R8 NC
R29 NC
C9 NC
Q4 NC
R9 NC
C4 NC
TO MIC
RED
C5 NC
BLACK
R6 NC
IC1
VDD
COM
TNH
VEE
VSS
A
B
C
5V
0V
R2 10K
Q3
R10 10K
D1
R11 270
NOT USE
D2
J102 NC
LED1
R31 NC
R35 NC
Q6 NC
R32 NC
Q5 NC
J101 NC
0V/3.3V/5V
R28 10K
R3 10K
R4 10K
R5 10K
R7 10K
TO:DIGITAL BOARD
CN1
KSTART 1
KIN3 2
KIN2 3
KIN1 4
KIN0 5
E 6
RS 7
OPESEL 8
+5V 9
C1 Z0.1u
C2 100u
5V
0V
CN2
MICIN 1
AG 2
NC 3
DG 4
KRXD 5
KTXD 6
KLATCH 7
KSCLK 8
5V
0V
5V
0V
R12 56K
PS1
Q1
PAPER SENSOR1
PS2
Q2
PAPER SENSOR2
R13 10K
R15 10K
R17 10K
R19 10K
SW1 NO USE NC
SW8 2
SW16 3
SW24 1
SW2 NO USE NC
SW9 5
SW17 6
SW25 4
SW3 NO USE NC
SW10 8
SW18 9
SW26 7
SW4 NO USE NC
SW11 0
SW19[3] #
SW27 *
SW5 NO USE NC
SW12 REDIAL/PAUSE
SW20 MUTE
SW28 FLASH
SW6 (↑)
SW13 MONITOR
SW21 (↓)
SW29 MENU
SW14 (→)
SW22 (←)
SW30 HELP
SW7 RECEIVE MODE
SW15 COPY
SW23 STOP
SW31 FAX/START
R14 470
R16 470
R18 470
R20 470
LCD MODULE
R33 4.7
C6 Z0.22u
R30 750
R34 NC
C7 NC
C8 NC
CN3
1 VSS
2 VDD
3 V0
4 RS
5 R/W
6 E
7 DB0
8 DB1
9 DB2
10 DB3

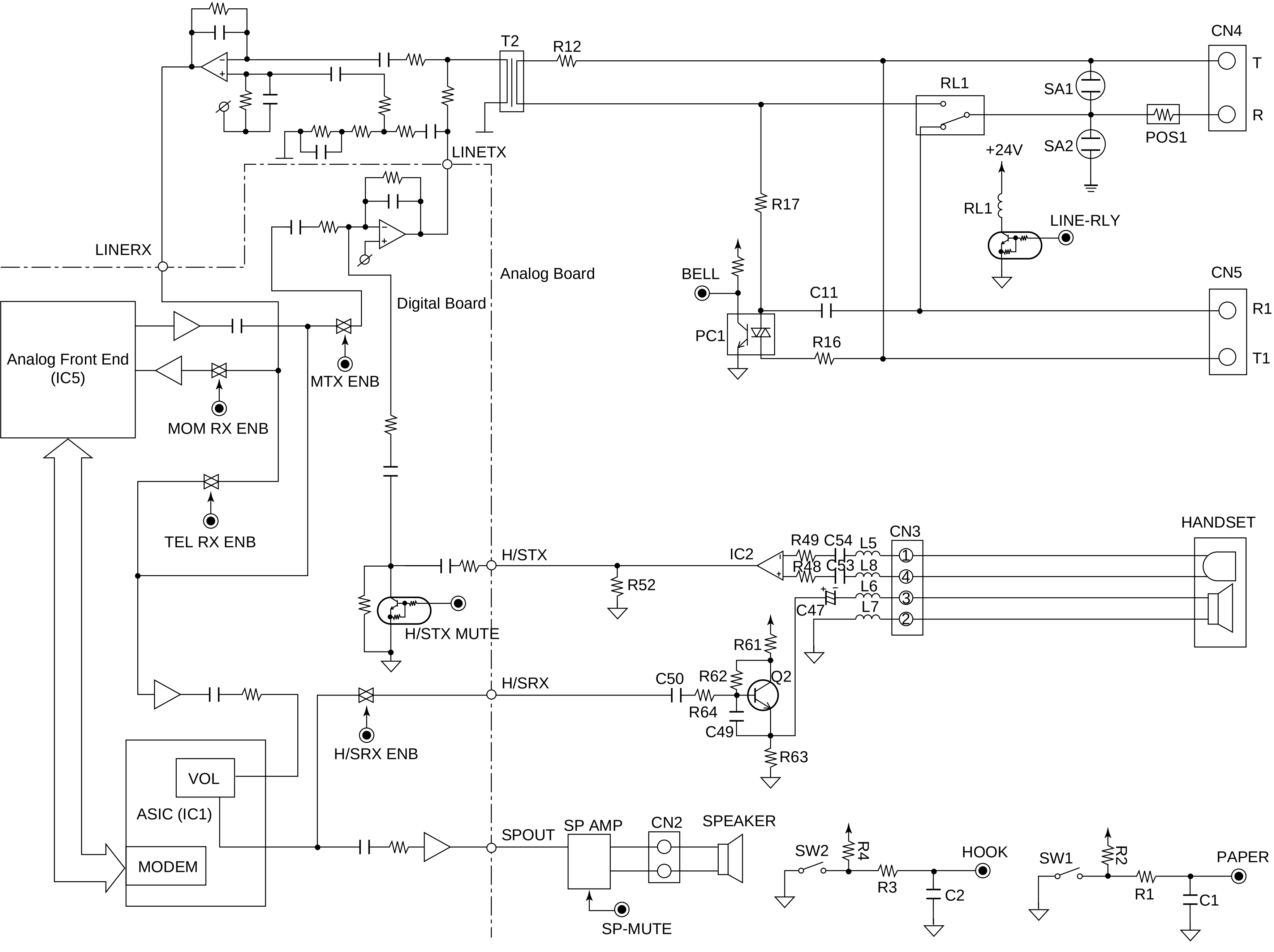
OPERATION BOARD SCHEMATIC DIAGRAM
KX-FT71LA-B


A,D-Bus
Bottom side
Upper side
Component View
Dipping side
TEST Land
IC2
(ROM)
24V
IC3
(SRAM)
ROMCE
RA1- RA5
TEST
X3
X2
IC1 (ASIC)
3.3V
BAT1
X1
RAMCS
GND
5V

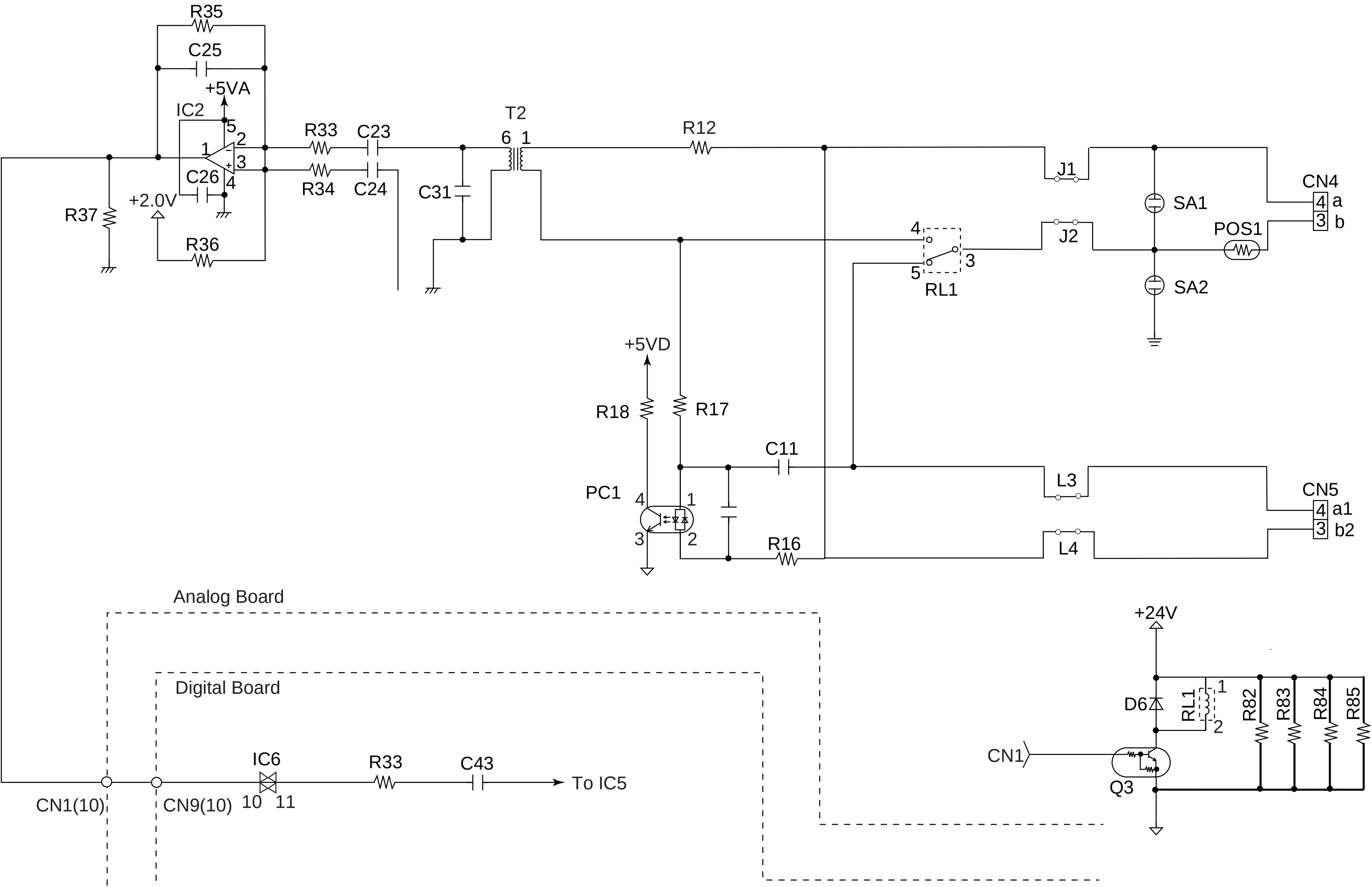

POWER SUPPLY
AC120V
REG
+24V
+5V
OPERATION PANEL
LCD
SELE CTOR
SENSOR
KEY MATRIX
DIGITAL BOARD
ANALOG BOARD
+24V
+5V
MOS SW
REG
3.3V
SRAM 256k
ROM 1M
5V
RESET
CODEC
ANA LOG SW
+24V
+5V
LINE
RLY
BELL
PC
EXT. TEL
THERMAL HEAD
CIS
PRINTER CONTROL
I/O
OSC
CPU I/F
OP PANEL I/F
VOL
ASIC
ROM
MODEM
A/D
IMAGE PROCESSING
MOTOR I/F
RTC
HOOK
HOOK SW
PAPER
PAPER
SP AMP
SP MUTE
SENSOR
MOTOR
SPEAKER
HANDSET

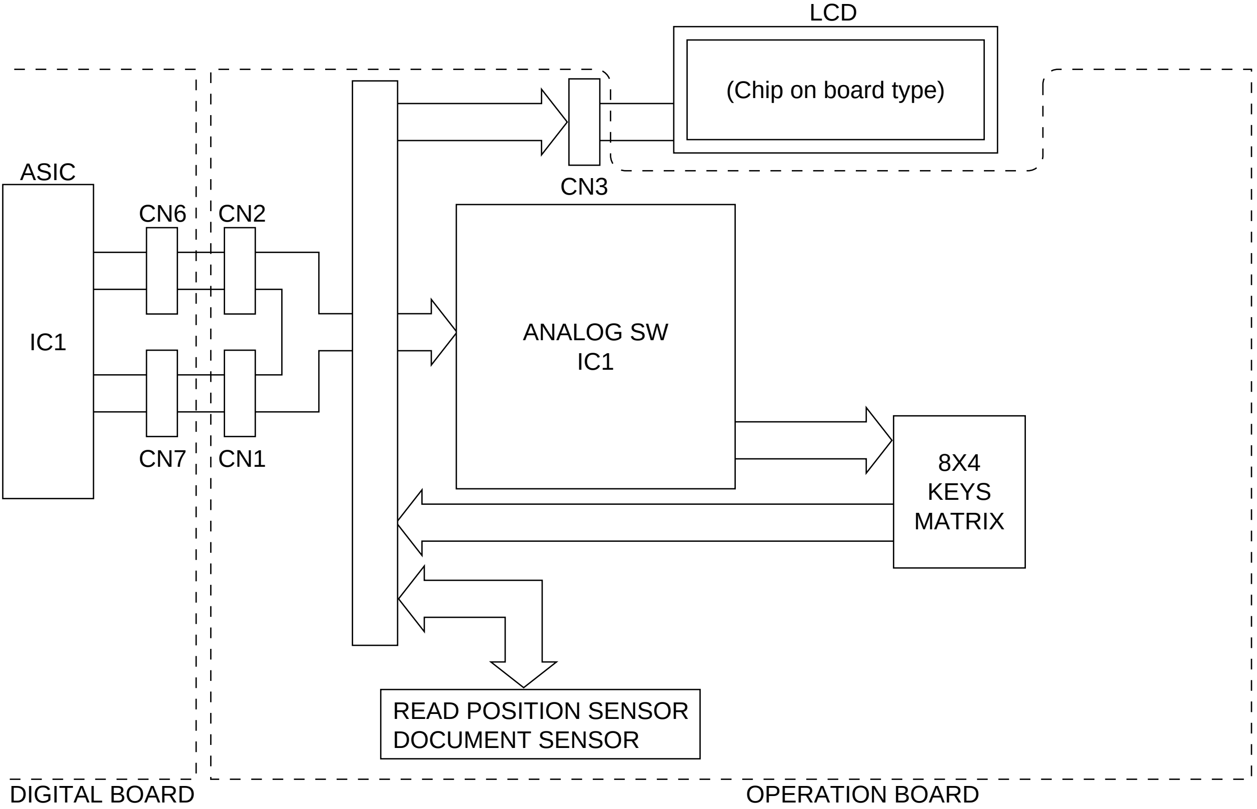

ROM (IC2)
A0-17
D0-7
RD
SRAM (IC3)
A0-17
D0-7
RD
WR
ANALOG FRONT END (IC5)
TXOUT
RXIN
ANALOG PORT CONTROL
I/0
ANALOG SW
(IC6)
TO ANALOG
TX
RX
H/S RX
H/S TX
SP
+24V
+5V
TO
CIS
CLK, SIG
24V
Q13
LED ON
RD
WR
A0-17
D0-7
20.736MHz
CIS-CTL
ASIC
IC1
VOL
TH ON
HEAD-CTL
XWDERR
XRESETI
TO
THERMAL HEAD
STBI-2,THLAT
THCLK,THDAT
32.768KHz
24MHz
TO
OPE PANEL
KSTART,KLATCH,KSCLK,KTXD,KRXD,KIN0,KIN1,KIN2,KIN3
RS,E
TO
MOTOR
(IC7)
MOTOR
DRIVER
T0,T2~T5
5V
(IC4)
RESET
BACK UP
TO SRAM (IC3)

KX-FT71LA-B DIGITAL BOARD: BLOCK DIAGRAM

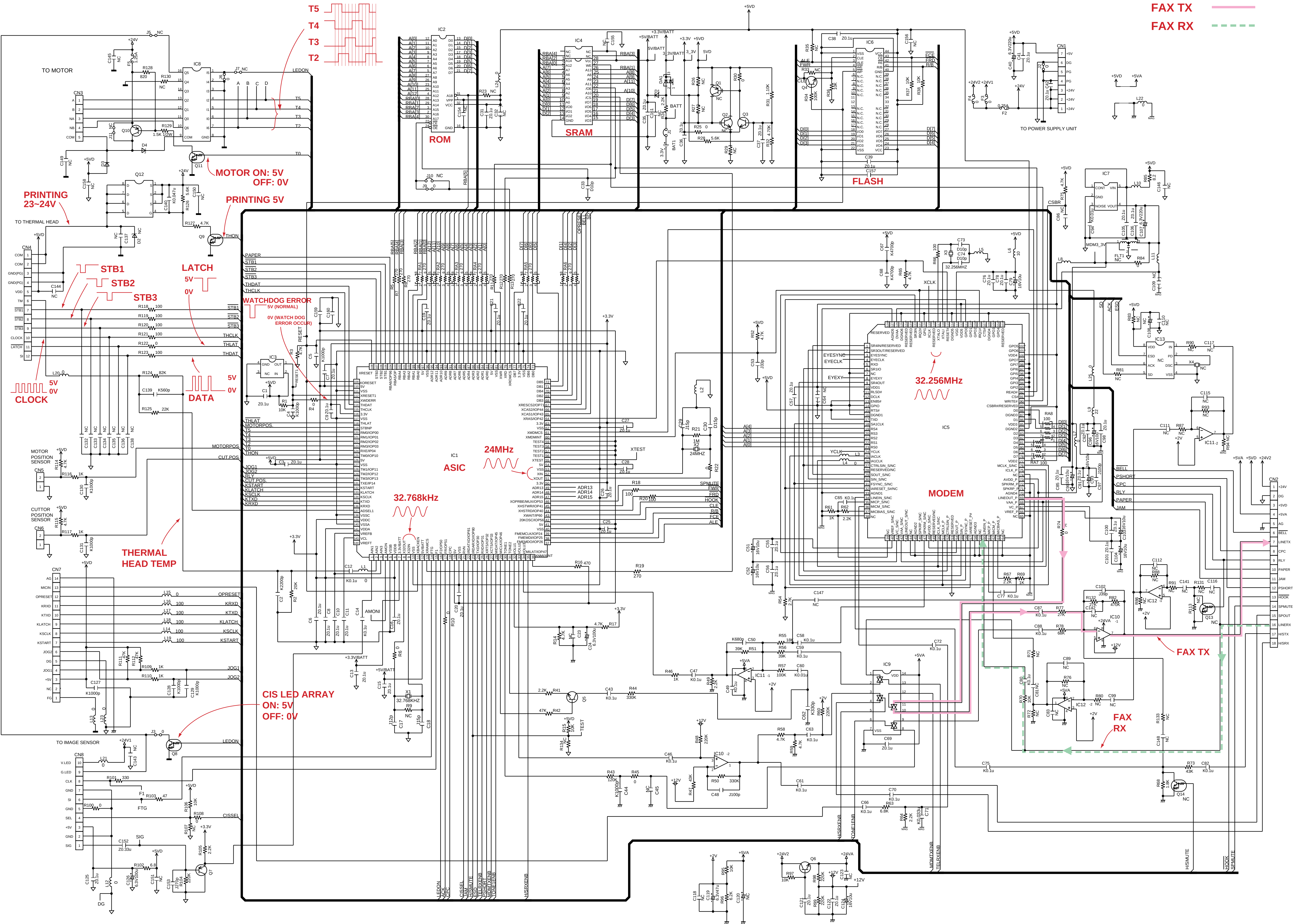

CN4
T
R
POS1
SA1
SA2
RL1
+24V
RL1
LINE-RLY
CN5
R1
T1
C11
R16
R17
BELL
PC1
T2
R12
LINETX
LINERX
Analog Board
Digital Board
Analog Front End
(IC5)
MTX ENB
MOM RX ENB
TEL RX ENB
HANDSET
CN3
1
4
3
2
L5
L8
L6
L7
R49
C54
R48
C53
C47
IC2
R52
H/STX
H/STX MUTE
R61
R62
Q2
R63
R64
C49
C50
H/SRX
H/SRX ENB
VOL
ASIC (IC1)
MODEM
SPOUT
SP AMP
CN2
SPEAKER
SP-MUTE
SW2
R4
R3
C2
HOOK
SW1
R2
R1
C1
PAPER

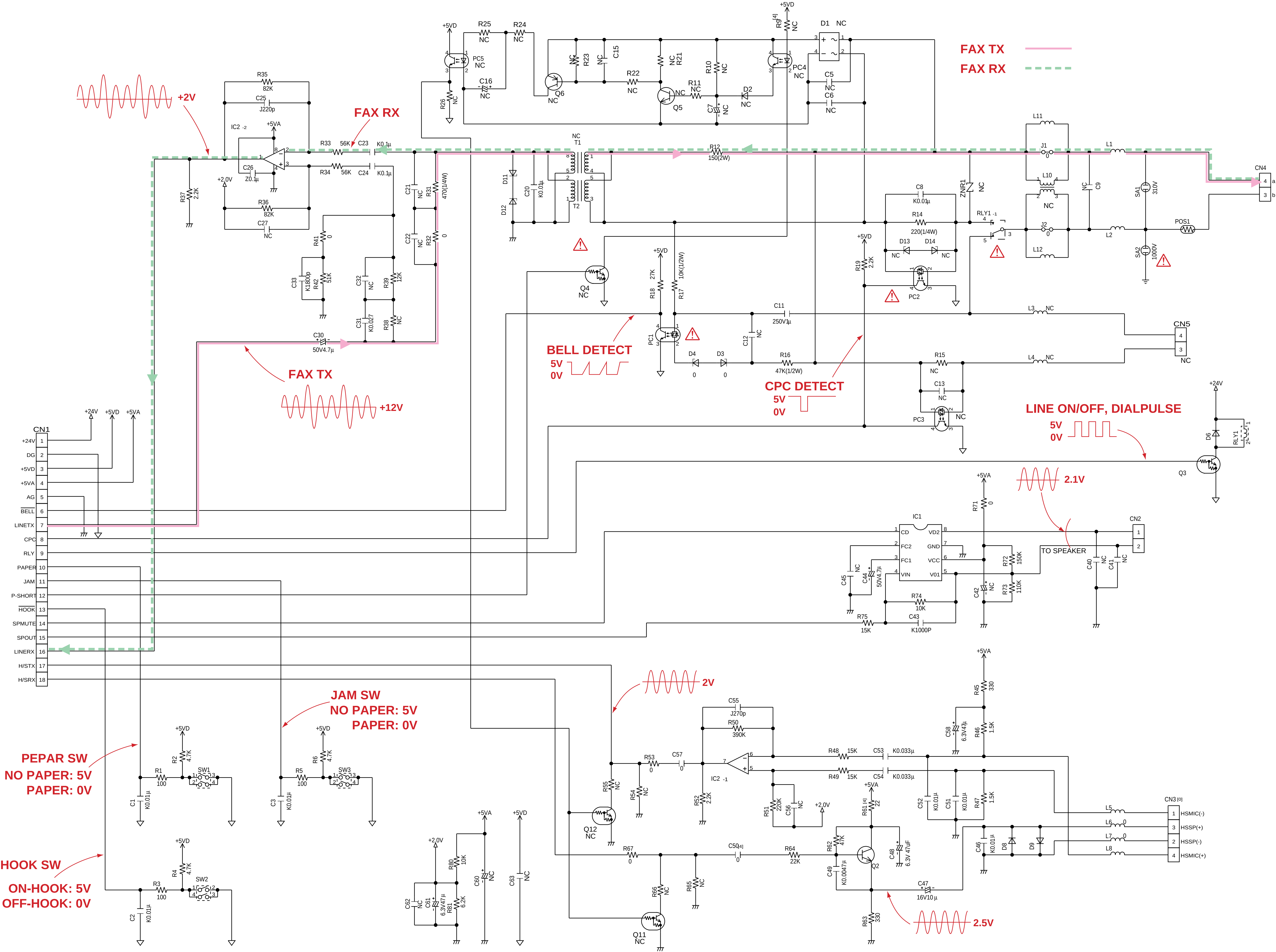
KX-FT71LA-B ANALOG BOARD: BLOCK DIAGRAM

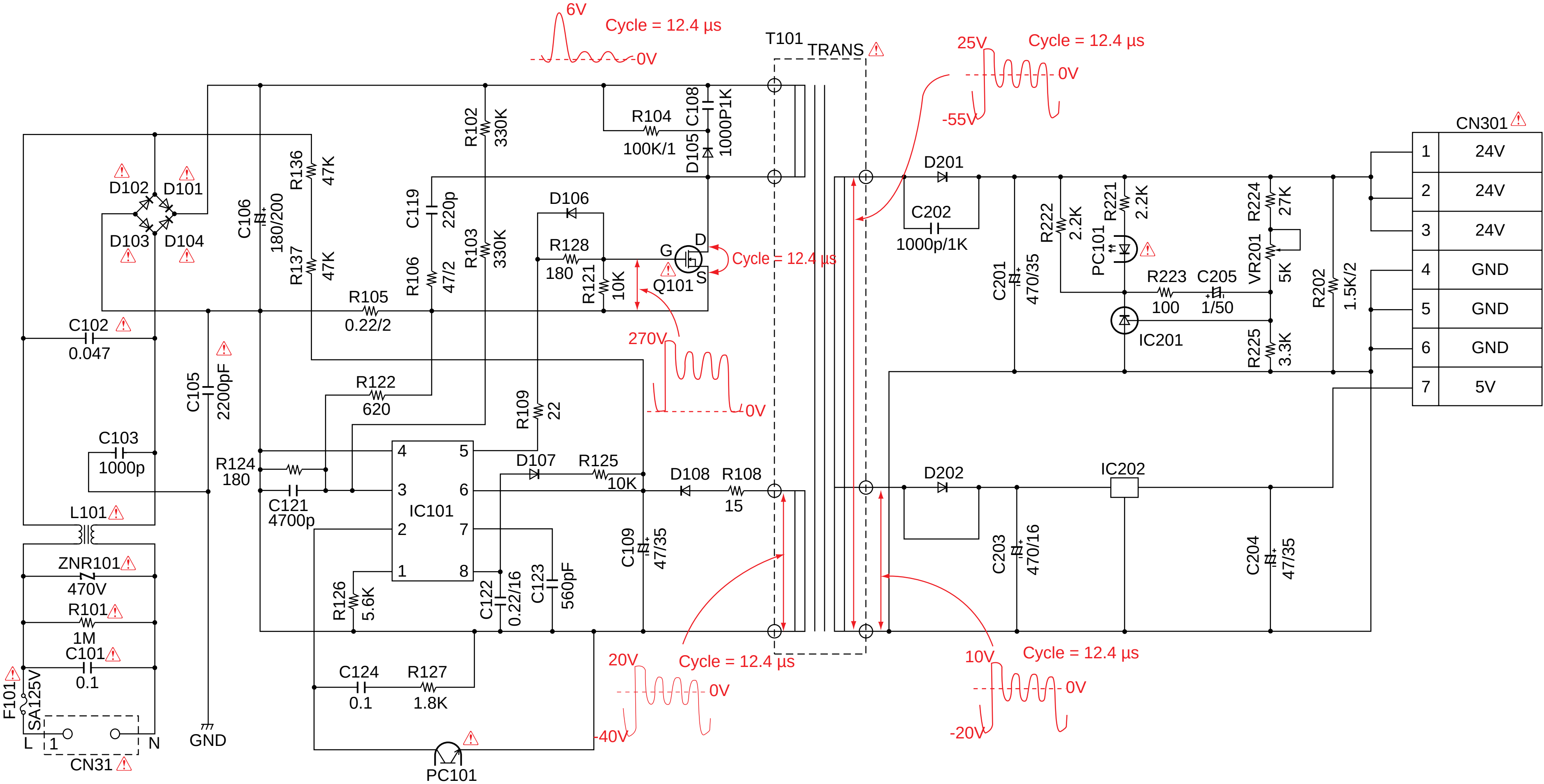

R35
C25
+5VA
IC2
5
2
1
3
4
C26
+2.0V
R36
R37
R33
C23
R34
C24
C31
T2
6
1
R12
J1
J2
SA1
SA2
POS1
CN4
4
a
3
b
RL1
4
3
5
+5VD
R18
R17
C11
PC1
4
1
3
2
R16
L3
L4
CN5
4
a1
3
b2
Analog Board
Digital Board
+24V
D6
RL1
1
2
R82
R83
R84
R85
CN1
Q3
IC6
R33
C43
To IC5
CN1(10)
CN9(10)
10
11

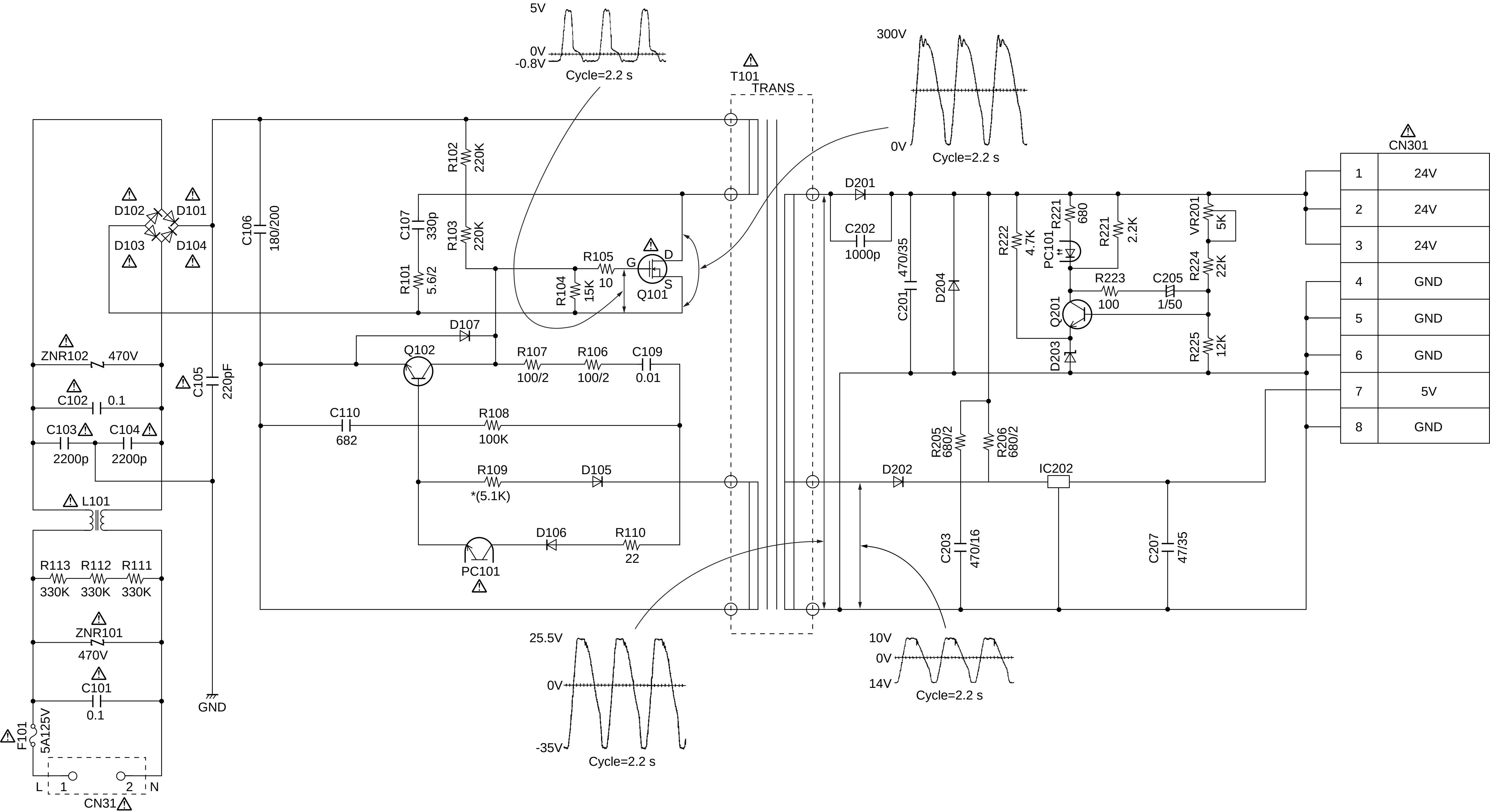

LCD
(Chip on board type)
CN3
ASIC
IC1
CN6
CN2
CN7
CN1
ANALOG SW
IC1
8X4
KEYS
MATRIX
READ POSITION SENSOR
DOCUMENT SENSOR
DIGITAL BOARD
OPERATION BOARD

KX-FT71LA-B OPERATION BOARD:BLOCK DIAGRAM


T5
T4
T3
T2
FAX TX
FAX RX
TO MOTOR
MOTOR ON: 5V
OFF: 0V
PRINTING 23~24V
PRINTING 5V
TO THERMAL HEAD
STB1
STB2
STB3
LATCH
5V
0V
WATCHDOG ERROR
5V (NORMAL)
0V (WATCH DOG ERROR OCCUR)
CLOCK
DATA
THERMAL HEAD TEMP
CIS LED ARRAY
ON: 5V
OFF: 0V
MOTOR POSITION SENSOR
CUTTER POSITION SENSOR
TO IMAGE SENSOR
TO POWER SUPPLY UNIT
ROM
SRAM
FLASH
ASIC
MODEM
24MHz
32.768kHz
32.256MHz
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
+5VD
+3.3V
+24V
+5VA
+12V


FAX TX
FAX RX
+2V
FAX RX
FAX TX
+12V
BELL DETECT
5V
0V
CPC DETECT
5V
0V
LINE ON/OFF, DIALPULSE
5V
0V
2.1V
TO SPEAKER
2V
2.5V
JAM SW
NO PAPER: 5V
PAPER: 0V
PEPAR SW
NO PAPER: 5V
PAPER: 0V
HOOK SW
ON-HOOK: 5V
OFF-HOOK: 0V
CN1
+24V 1
DG 2
+5VD 3
+5VA 4
AG 5
BELL 6
LINETX 7
CPC 8
RLY 9
PAPER 10
JAM 11
P-SHORT 12
HOOK 13
SPMUTE 14
SPOUT 15
LINERX 16
H/STX 17
H/SRX 18
CN4
4 a
3 b
CN5
4
3
NC
CN2
1
2
CN3
1 HSMIC(-)
3 HSSP(+)
2 HSSP(-)
4 HSMIC(+)
IC1
CD
FC2
FC1
VIN
VD2
GND
VCC
V01
IC2
T1
T2
D1 NC
PC1
PC2
PC3
PC4
PC5
RLY1
SW1
SW2
SW3
Q2
Q3
Q4 NC
Q5
Q6
Q11 NC
Q12 NC
L1
L2
L3 NC
L4 NC
L5
L6
L7
L8
L10
L11
L12
J1
J2
SA1 310V
SA2 1000V
POS1
ZNR1 NC
R12 150(2W)
R14 220(1/4W)
R16 47K(1/2W)
R17 10K(1/2W)
R31 470(1/4W)
C11 250V1µ
C30 50V4.7µ
+5VD
+5VA
+24V
+2.0V


6V
Cycle = 12.4 µs
0V
T101
TRANS ⚠
25V
Cycle = 12.4 µs
0V
-55V
CN301 ⚠
1 24V
2 24V
3 24V
4 GND
5 GND
6 GND
7 5V
R102
330K
R104
100K/1
C108
1000P1K
D105
D102 ⚠
D101 ⚠
D103 ⚠
D104 ⚠
R136
47K
C106
180/200
C119
220p
D106
R128
180
G
D
S
Q101 ⚠
Cycle = 12.4 µs
R121
10K
R137
47K
R106
47/2
R103
330K
R105
0.22/2
D201
C202
1000p/1K
R222
2.2K
R221
2.2K
PC101 ⚠
R224
27K
VR201
5K
R223
100
C205
1/50
C201
470/35
IC201
R225
3.3K
R202
1.5K/2
C102 ⚠
0.047
C105
2200pF
⚠
270V
0V
R122
620
R109
22
C103
1000p
R124
180
C121
4700p
4
5
3
6
IC101
2
7
1
8
D107
R125
10K
D108
R108
15
D202
IC202
L101 ⚠
ZNR101 ⚠
470V
R101 ⚠
1M
C101 ⚠
0.1
F101 ⚠
SA125V
L
1
N
CN31 ⚠
GND
R126
5.6K
C122
0.22/16
C123
560pF
C109
47/35
C203
470/16
C204
47/35
C124
0.1
R127
1.8K
PC101
⚠
20V
Cycle = 12.4 µs
0V
-40V
10V
Cycle = 12.4 µs
0V
-20V


5V
0V
-0.8V
Cycle=2.2 s
300V
0V
Cycle=2.2 s
⚠
T101
TRANS
⚠
CN301
1
24V
2
24V
3
24V
4
GND
5
GND
6
GND
7
5V
8
GND
⚠ D102
⚠ D101
D103 ⚠
D104 ⚠
C106
180/200
R102
220K
C107
330p
R103
220K
R101
5.6/2
R105
10
R104
15K
G
D
S
⚠
Q101
D107
Q102
R107
100/2
R106
100/2
C109
0.01
C110
682
R108
100K
R109
*(5.1K)
D105
D106
R110
22
PC101
⚠
⚠
ZNR102
470V
⚠
C102
0.1
C103 ⚠
C104 ⚠
2200p
2200p
⚠ C105
220pF
⚠ L101
R113
330K
R112
330K
R111
330K
⚠
ZNR101
470V
⚠
C101
0.1
⚠ F101
5A125V
L
1
2
N
CN31 ⚠
GND
D201
C202
1000p
C201
470/35
D204
R222
4.7K
PC101
R221
680
R221
2.2K
VR201
5K
R224
22K
R223
100
C205
1/50
Q201
D203
R225
12K
R205
680/2
R206
680/2
D202
IC202
C203
470/16
C207
47/35
25.5V
0V
-35V
Cycle=2.2 s
10V
0V
14V
Cycle=2.2 s